Introduction
Prepolarized MRI (PMRI) [1,2] is an inexpensive MRI architecture that uses a mid-field copper wire magnet ($B_p$) for longitudinal magnetization growth and a low-field magnet ($B_0$) for spatial encoding and data acquisition, as shown in Fig. 1. This setup offers the SNR of mid-field imaging combined with the benefits of low-field imaging, which include reduced susceptibility shifts, relaxed homogeneity, reduced SAR, and quiet gradients. The magnets, gradients, and RF coils in our 0.4T/52mT PMRI magnet system cost only $25,000 in total. Slice interleaving is inefficient for volumetric imaging in PMRI, so a fast 3D imaging technique, such as RARE [3], is essential to efficient PMRI.

Methods
We implemented RARE in PMRI using special techniques for eliminating artifacts due to transient $B_0$ field error and concomitant gradient fields. The transient $B_0$ error caused by ramping $B_p$ was minimized by properly ramping the two magnets to minimize the induced-EMF voltage on the $B_0$ magnet. We also evaluated two novel methods for compensating the phase of the CPMG echo train in the presence of transient field error. Lastly, we used quadratic nulling [4] to minimize the artifacts due to concomitant gradient fields. The flexibility of RARE allowed us to achieve $T_1$ and $T_2$ contrast by changing the order of k-space acquisition within each echo train to modify the effective TE.

Results and Discussion
Our methods for implementing RARE in PMRI were effective and enabled us to achieve clinical resolution and scan times for in vivo wrist imaging, as shown in Fig. 2. Figure 3 demonstrates the use of RARE to image with both $T_1$ and fat-suppressed $T_2$ contrast. This work demonstrates the ability to perform clinical quality imaging with PMRI, and as we increase our field levels to 1.0T/0.2T, we expect to achieve SNR close to that of a 1.0T conventional MRI scanner. PMRI has great potential for diagnostic imaging near metal in the body due to greatly reduced susceptibility artifacts at low field.