

Abstract Submitted  
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**A new algorithm for detection of apnea in infants in neonatal intensive care units**<sup>1</sup> HOSHIK LEE, College of William and Mary, BROOKE VERGALES, ALIX PAGET-BROWN, CRAIG RUSIN, RANDALL MOORMAN, JOHN KATTWINKEL, University of Virginia, JOHN DELOS, College of William and Mary — Apnea is a very common problem for premature infants: apnea of prematurity (AOP) occurs in  $> 50\%$  of babies whose birth weight is less than 1500 g, and AOP is found in almost all babies who are  $< 1000$  g at birth. Current respiration detectors often fail to detect apnea, and also give many false alarms. We have created a new algorithm for detection of apnea. Respiration is monitored by continuous measurement of chest impedance (CI). However, the pulsing of the heart also causes fluctuations in CI. We developed a new adaptive filtering system to remove heart activity from CI, thereby giving much more reliable measurements of respiration. The new approach is to rescale the impedance measurement to heartbeat-time, sampling 30 times per interbeat interval. We take the Fourier transform of the rescaled signal, bandstop filter at 1 per beat to remove fluctuations due to heartbeats, and then take the inverse transform. The filtered signal retains all properties except the impedance changes due to cardiac filling and emptying. We convert the variance of CI into an estimated likelihood of apnea.

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