**Papers:**

1. **Α Respiratory Sound Database for the Development of Automated Classification (**[***link***](https://eden.dei.uc.pt/~ruipedro/publications/Conferences/ICBHI2017a.pdf)**)**

**Abstract:** The automatic analysis of respiratory sounds has been a field of great research interest during the last decades. Automated classification of respiratory sounds has the potential to detect abnormalities in the early stages of a respiratory dysfunction and thus enhance the effectiveness of decision making. However, the existence of a publically available large database, in which new algorithms can be implemented, evaluated, and compared, is still lacking and is vital for further developments in the field. In the context of the International Conference on Biomedical and Health Informatics (ICBHI), the first scientific challenge was organized with the main goal of developing algorithms able to characterize respiratory sound recordings derived from clinical and non-clinical environments. The database was created by two research teams in Portugal and in Greece, and it includes 920 recordings acquired from 126 subjects. A total of 6898 respiration cycles were recorded. The cycles were annotated by respiratory experts as including crackles, wheezes, a combination of them, or no adventitious respiratory sounds. The recordings were collected using heterogeneous equipment and their duration ranged from 10s to 90s. The chest locations from which the recordings were acquired was also provided. Noise levels in some respiration cycles were high, which simulated real life conditions and made the classification process more challenging.

**Conclusion:** The creation of this database and the related scientific challenge constitute an initial but decisive step towards leveraging computational lung auscultation, and also towards highlighting the complexity of the RS classification problem. The availability of the database after the challenge (details will be posted on the challenge’s website), along with the challenge’s approaches and results, will set the basis to ensure the continuation of efforts, hopefully inspiring and facilitating future relevant competitions.

2. **LungBRN: A Smart Digital Stethoscope for Detecting Respiratory Disease Using bi-ResNet Deep Learning Algorithm (**[***link***](https://ieeexplore.ieee.org/abstract/document/8919021)**)**

**Abstract:** Improving access to health care services for the medically under-served population is vital to ensure that critical illness can be addressed immediately. In the scenarios where there is a severely lacking of skilled medical staff, a basic lung sound classification through a digital stethoscope can be used to provide an immediate diagnostic for respiratory-related diseases such as chronic obstructive pulmonary. In this work, we have developed an improved bi-ResNet deep learning architecture, LungBRN, which uses STFT and wavelet feature extraction techniques to improve the accuracy compared to the state-of-the-art works. To ensure a fair evaluation, we have adopted the official benchmark standards and the "train-and-test" dataset splitting method stated in the ICBHI 2017 challenge. As a result, we are able to achieve a performance of 50.16%, which is the best result in terms of accuracy compared to all participating teams from ICBHI 2017.