



Contribution ID: 32

Type: Oral presentation

## Enhancing Ultrasound Localization Microscopy (ULM) with Spatio-Temporal Deep Learning

Thursday 3 October 2024 09:30 (20 minutes)

The integration of Ultrasound Localization Microscopy (ULM) into ultrasound imaging has significantly improved resolution, providing precise insights into blood flow direction and velocity. However, despite its potential, ULM remains a complex and time-consuming technique, even as deep learning (DL) continues to drive its optimization. Current DL methods for microbubble (MB) superlocalization face challenges due to the use of high-resolution images in their networks, resulting in longer processing times compared to traditional ULM methods. Additionally, these methods often require arbitrary filtering of results before integration into tracking algorithms. To address these challenges, our study introduces a novel DL approach inspired by single-molecule localization techniques. Our 3D convolutional neural network, called 3DML-ResNet, enables fast and scalable superlocalization while providing explicit estimation of the number of MBs present in each image.

### Contribution length

Short

**Primary authors:** PHAM, Duong Hung (Institut de recherche en informatique de Toulouse, Université Toulouse III - Paul Sabatier); PUSTOVALOV, Vassili (Institut de recherche en informatique de Toulouse, Université Toulouse III - Paul Sabatier)

**Co-author:** KOUAMÉ, Denis (Institut de recherche en informatique de Toulouse, Université Toulouse III - Paul Sabatier)

**Presenter:** PUSTOVALOV, Vassili (Institut de recherche en informatique de Toulouse, Université Toulouse III - Paul Sabatier)