How is science and technology changing the way that music is being created and played? Read on to find out how some new software is helping musicians to keep the beat.

A new software enables bands to play more freely when using pre-programmed music.

Love of music

The B-Keeper (Beat Keeper) software developed by Dr Andrew Robertson at Queen Mary University isn't just an academic project. This sophisticated form of the click track which drummers use to keep time came out of his love of music. 'I was doing a lot of music stuff in London,' says Robertson. 'I do a lot of guitar playing in bands and I did a course at King's College on neural networks, and that led to the group here at Queen Mary University, University of London, which houses the Centre for Digital Music.' The backing track Robertson's band had been using sounded a little soulless. The problem with the conventional click track is that it doesn't allow for any variation in speed or spontaneity when using pre-programmed music. 'It didn't feel like a proper gig, and I thought "Well, surely it could just follow us?" That seemed to be a research question.'

Not flexible

The click track, like a metronome fed in through headphones, is essential for keeping the band in time with any pre-programmed music. But it's also very rigid when you are playing a gig or even when developing a song in rehearsal. Roberston says that creating music requires a kind of 'flow', but it's difficult to achieve in rehearsal when the band are so focused on keeping the tempo set by a click track. 'A very important thing about music is surprise, and that's the excitement factor, and you can lose that by playing to a rigid thing, like having a silent car alarm in the background.'

Speeds up, slows down

He designed the B-Keeper program in Java and the drummer no longer needs to listen to the click. The software makes as small an adjustment as possible, so when the drummer speeds up slightly, everything is moved and happens slightly earlier. 'It's a dynamic system,' says Robertson. 'It's always correcting and there are "windows" around the beat where B-Keeper expects the beats to be, which can get really narrow if the drumming is really precise, or they can get wider if the drummer is varying.' Robertson has made the software available for other bands to use and will use the feedback to develop it further.

If you're interested in science check out the British Council's science magazine called *Cubed* at http://www.britishcouncil.org/cubed.