Claire Genewein studied modern flute at the Mozarteum in Salzburg and with Philippe Racine at the Zurich School of Music, subsequently gaining a diploma in early music at the Schola Cantorum Basiliensis specialising in early flutes, and Master of Music at the Royal Conservatory in The Hague with Barthold Kuijken. In 2014 she was awarded a PhD from the University of Leiden (NL) for her dissertation on "Vocal instrumental playing. The underlaying of text to music as a technique in the 18th century".

Claire Genewein works as a flautist in various ensembles including L'Orfeo Baroque Orchestra, La Cetra, Venice Baroque Orchestra, Il Gusto Barocco, L'Arcadia and Ensemble Miroir. She has played under conductors such as Michi Gaigg, Gustav Leonhardt, Andrea Marcon, Jörg Halubeck, Jordi Savall, Geoffrey Lancaster and William Christie. As a soloist she can be heard on recordings including the op. Il Sonatas by Gasparo Fritz, Mozart's Magic Flute in an arrangement from 1793 for flute quartet and Italian Rococo at the Ermitage. Since 2006 she has taught early flutes and historical performance practice at the Bruckner University in Linz (Austria) and since 2010 at the Zurich University of the Arts.