Metal–organic frameworks (MOFs), or networked solids containing both inorganic and organic moieties linked in an infinite array, have received considerable attention in the past two decades. Significant advances in creating chemically complex structures of increasing internal surface areas have been made, building on the deliberate assembly of rod-like components into the scaffolding-like structures reported by Robson in 1990. Early priority was given to the creation of what where considered at the time to be rigid structures, in order to support the presence of large internal cavities, with an eye on applications such as fluid adsorption, separation and catalysis. Whilst still true for some UiO-type frameworks (Yot, DOI: 10.1039/C5DT03621F), our perception of MOFs as structurally intransigent materials is now being challenged.

In this issue, we provide examples of this recent research on MOF flexibility, such as the synthesis and breathing ability of novel MIL-53 derivatives (Stock, DOI: 10.1039/C5DT03510D; Walton, DOI: 10.1039/C5DT03438H), and a short review of those MOFs containing neutral N-donor ligands (Ghosh, DOI: 10.1039/C5DT03498A) on IRMOF-1 not only illustrates the unexpected presence of disorder in prototypical MOFs such as IRMOF-1, but also provides a demonstration of defects in MOFs, in what some may consider a natural consequence of disorder. A short review by Farrusseng focuses on the link between these defects and the catalytic properties of MOFs (DOI: 10.1039/C5DT03522H).

It is perhaps a natural progression, given the field’s continuing maturity, that researchers from domains outside of what we might associate with classical MOF chemistry are starting to contribute. Articles on the non-linear optical properties of MOF-dye composites (Qian, DOI: 10.1039/C5DT03466C), screening of linker candidates under large deformations (Greaney, DOI: 10.1039/C5DT03511B), the application of counting theory and rigidity rules to MOFs (Marmier, DOI: 10.1039/C5DT03586D) and application of soft matter modelling techniques such as coarse-grained simulations (Schmid, DOI: 10.1039/C5DT03865K) are fitting testament to our continuing ability to explore this rich and diverse field.

Whilst it has ultimately proved impossible to mention all of the included research papers here, we encourage you to discover their diversity, excellence and novelty by reading this themed collection. Of course, none of this would be possible without the efforts and contributions of our colleagues, in both submitting and reviewing the papers presented here. We also want to thank all participants to the CECAM Workshop on Flexibility and Disorder in Metal–Organic Frameworks (Website: http://molsim.info/MOF-flexibility-disorder/), held in June 2015.
at Chimie ParisTech, organized in conjunction with this themed issue. The discussions in Paris clearly demonstrated both how far we have progressed and the numerous open questions remaining on the road ahead of us, highlighting the vitality of this field of research.

Finally, we would like to extend our sincere thanks to the staff at *Dalton Transactions*, and in particular Guy Jones and Laurent Mathey, for their dedication, enthusiasm and hard work in bringing together this issue.