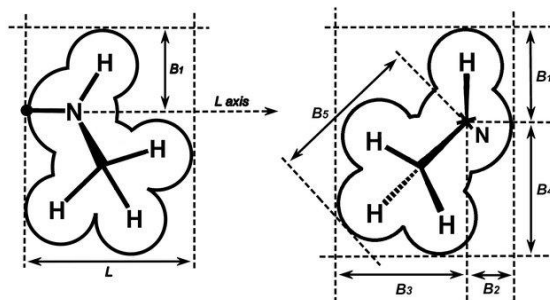*Simone Di Noja, 07/10/2022*

Conformational Effects on Physical-Organic Descriptors: The Case of Sterimol Steric Parameters

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Who are the corresponding authors and what are their research areas?

Stephen P. Fletcher

Fletcher is an organic chemist. His areas of interest are the design via asymmetric catalysis of important molecular scaffolds, like natural products and drugs. Recently, his group has been studying new themes, such as non-equilibrium self-assembly and the operation of new molecular machines.

Robert S. Paton

Paton is a computational chemist, with expertise in asymmetric catalysis. Paton group's research is focused on the development and application of computational tools to accelerate chemical discovery. Quantum chemistry, open-source software and statistical modeling tools are used to explore organic reactivity and selectivity aided by collaborations with experimentalists.

What is the main claim of the article?

Main claim: In this work, the authors introduce an automated computational workflow that can be used to obtain multidimensional Sterimol parameters (namely L, B1 and B5) for a conformational ensemble of a given substituent. These parameters are weighted according to Boltzmann distribution of the different conformations that the functional group can assume. This approach is particularly relevant to understand and rationalize the effect of different groups in the activity enantioselective catalysts.

How is it demonstrated?

Demonstration: software used is PyMol, with home-made written plugins. Other necessary softwares are MOPAC (or Gaussian) and *i.e.* Avogadro to draw molecules.

Which are the key related papers?

- Harper, K. C.; Bess, E. N.; Sigman, M. S. Multidimensional Steric Parameters in the Analysis of Asymmetric Catalytic Reactions. *Nat. Chem.* **2012**, 4, 366−374.   DOI: 10.1038/nchem.1297