

Thieme Publishers and IUPAC in collaboration with the editors of *SYNTHESIS*, *SYNLETT*, *Science of Synthesis*, and *Houben–Weyl* announce the recipient of the

# 2006 Thieme–IUPAC Prize in Synthetic Organic Chemistry



## David W.C. MacMillan



We are pleased to announce that the 2006 Thieme–IUPAC Prize awardee is David W.C. MacMillan of the California Institute of Technology. The Prize, consisting of 5000 Euros, is awarded every two years on the occasion of the IUPAC International Conference on Organic Synthesis (ICOS) to a scientist under 40 years of age whose research has had a major impact on the field of synthetic organic chemistry. The Prize will be presented to David MacMillan at his Award Lecture on June 13, 2006, at the ICOS-16 Conference in Mérida, Mexico.

David MacMillan was born in 1968 in Bellshill, Scotland. He obtained his undergraduate degree from Glasgow University, and in 1990 moved to the University of California, Irvine, where he obtained his Ph.D. under the direction of Larry E. Overman. Following postdoctoral research with David A. Evans at Harvard University, David began his independent research career at the University of California, Berkeley, in 1998. In 2000, he joined the department of chemistry at Caltech, and was promoted to full professor in 2003.

Through his research contributions, David MacMillan has become a leader in the currently active area of asymmetric organocatalysis. His numerous accomplishments include the design of a series of chiral amines, available from amino acids, to catalyze the enantioselective cycloaddition reactions of dienes or 1,3-dipoles and  $\alpha,\beta$ -unsaturated aldehydes by reversible iminium ion formation.

The approach has been admirably applied to the catalytic asymmetric Friedel–Crafts alkylations of pyrroles, indoles, anilines, and furans, which proceed in excellent yields and with high enantiomeric excess. These are the first examples of this reaction in catalysis; no organometallic catalyst has been devised for these transformations.

In addition, using chiral amine catalysts, David has achieved the first enantioselective cross-aldol condensation of aldehydes, a reaction type which eluded chemists for some time, and could previously only be carried out with the aid of enzymes. This landmark achievement has been improved and extended, and applied to the rapid assembly of natural and nonnatural carbohydrates with enantioselectivities approaching 100%.

Recently, David and his group devised the first enantioselective transfer hydrogenation reaction for alkenes using organocatalysts. He has also introduced a new concept for asymmetric catalysis termed “enantioselective organo-cascade catalysis”. This conceptually new strategy relies on David’s finding that imidazolidinone catalysts can function as both iminium and enamine activation catalysts (orthogonal activation). By merging these catalytic cycles, it was demonstrated that the biochemical concept of enzymatic catalysis cascades can be emulated in the laboratory using small-molecule catalysts.

David W.C. MacMillan’s work has found widespread industrial application, and his generalization, systematic exploration, and brilliant conceptualization has made a major impact in launching enantioselective organocatalysis as a rapidly growing field of research for organic chemists. His success is reflected in the numerous awards he has received from the Royal Society of Chemistry, the American Chemical Society, Tetrahedron, Bristol-Myers Squibb, Pfizer, GlaxoSmith-Kline, Eli Lilly, and Boehringer Ingelheim, among other organizations.

We congratulate David MacMillan and look forward to hearing the latest exciting developments from his laboratories, an *Account* of which will be published in *SYNLETT*, at his Award Lecture in Mérida, Mexico.



David W.C. MacMillan

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Georg Thieme Verlag  
Rüdigerstraße 14  
70469 Stuttgart · Germany

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