

## A tribute to Lewis E Kay on his 50th birthday

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It is a great pleasure for us to introduce this special issue of the *Journal of Biomolecular NMR* on the occasion of Prof. Lewis E. Kay's 50th birthday. We are grateful to the Editors of the *Journal of Biomolecular NMR* for accepting our proposal. In particular, we thank Prof. Martin Billeter

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for editing this issue, and Dr. Ad Bax for advice and support.

We believe that Lewis merits this special issue of *Journal of Biomolecular NMR* for his innovative contributions to biomolecular NMR spectroscopy, as well as for his role as inspirer for a large group of young research professionals. The following short list of examples serves to illustrate how the work of Lewis Kay has helped to advance our field:

Lewis has consistently been a pioneer in the development of novel methods essential to increasing the size of proteins that may be studied by NMR. In the days when assigning chemical shifts of a protein with 150 amino acids was a major endeavour, the Kay lab—in collaboration with Prof. Cheryl Arrowsmith—combined advances in gradient-enhanced spectroscopy, protein deuteration and pulse sequence design to establish the resonance assignments for a 37 kDa complex.

As these techniques became more broadly used, his lab forged ahead with clever biochemical tricks for incorporating protonated methyl groups in otherwise deuterated proteins, and developed methyl TROSY experiments that permit well-resolved spectra to be obtained for high molecular weight complexes, extending to 1 MDa.

Lewis has been a leader in using NMR to measure fast timescale macromolecular dynamics, starting with his contributions to inverse-detected  $^{15}\text{N}$  relaxation experiments. His deuterium spin relaxation methodologies have had a huge impact on our ability to characterize side chain dynamics in proteins.

In addition, the Kay lab has extensively developed and applied new methodologies for studying low-populated states of proteins and their roles in biology. Building on transverse relaxation dispersion experiments, the Kay lab has introduced approaches to elucidate the three-

dimensional structures and dynamics of protein states so weakly populated that they are “invisible” to standard NMR experiments and most other biophysical and structural techniques.

For many of the above developments sample generation and preparation in a modern molecular biology lab was essential. Working closely together with his wife Julie, a professor at the Toronto Hospital for Sick Children, guaranteed the rapid and efficient production of samples for NMR spectroscopy as well as key scientific collaborations.

The reputation of Lewis Kay in the field of biomolecular NMR spectroscopy can hardly be overestimated. To date, Lewis has published more than 300 research papers in the general area of NMR spectroscopy, more than 50 of which have appeared in the *Journal of Biomolecular NMR* alone. Considering Lewis’ tremendous productivity, his pioneering development of new NMR methods, and his success in using them to address central questions in biophysics, it can safely be assumed that any practitioner of biomolecular NMR spectroscopy is well aware of Lewis’ contributions to the field. In fact, he is one of the 250 most-cited scientists in Chemistry world-wide, with three papers already cited more than 1,000 times each!

Lewis Kay is currently a professor in the Departments of Chemistry, Biochemistry and Molecular Genetics at the University of Toronto, and holds a Canada Research Chair in Proteomics, Bioinformatics and Functional Genomics. His work has been recognized with numerous awards,

including the Founders Medal of the International Conference on Magnetic Resonance in Biological Systems, the Laukien Prize of the Experimental NMR Conference, and the Premiers Discovery Award for Life Sciences and Medicine from the Government of Ontario, among many others. Lewis Kay has been elected Fellow of the Canadian and British Royal Societies.

On a personal level, those who have interacted with Lewis over the years have surely been struck by his generosity, humility, mischievous sense of humour, and his limitless passion and energy for science and his research group. As Lewis turns 50 years young we can only imagine what is yet to come. A consolidated hunt for ‘invisible structures’ and their roles in biology, unearthing the essential dynamics within large macromolecular complexes and machines, or something entirely novel and unexpected? Whichever it may be, we can be sure that it will be exciting and meet the highest academic and scholarly standards.

On behalf of all prior members of the Kay lab along with his many colleagues and friends in Toronto and around the world, we wish Lewis a happy 50th birthday—with celebrations for the heights that have been reached in the past, and a toast to the peaks that will be surmounted in many years to come. As one token of this, we hope that Lewis will enjoy this surprise issue and the scholarly achievements presented therein.