

GÜNTHER LAUKIEN PRIZE

Established in 1999 to honor the memory of Professor Günther Laukien, a co-founder of Bruker Instruments, the Laukien Prize carries a monetary award of \$15,000, funded by Bruker BioSpin. It is intended to “recognize cutting edge experimental NMR research with a high probability of enabling beneficial new applications.”

The Günther Laukien Prize for 2006 is awarded to **Thomas Szyperski**, State University of New York, Buffalo, **Eriks Kupce**, Varian Ltd, Surrey, **Ray Freeman**, Jesus College, Cambridge, and **Rafael Brüschweiler**, NHMFL, Tallahassee, for their ground-breaking work in speeding-up multi-dimensional NMR by novel procedures for scanning the data space and efficiently processing the results to obtain a conventional spectral representation.

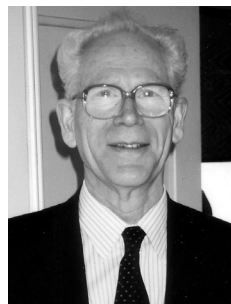
Multi-dimensional experiments have become indispensable in modern NMR despite the quite extensive time needed to perform them. The quest for speeding-up the recording process has become correspondingly urgent. A large number of approaches have been proposed by various research groups in recent years. Three seminal procedures were chosen to be honored by this year's Laukien Prize. A comprehensive coverage of all published proposals by a single prize turned out to be impossible.



Thomas Szyperski



Eriks Kupče



Ray Freeman



Rafael Brüschweiler

Thomas Szyperski devised GFT NMR for reducing the dimensionality of multi-dimensional NMR. By projecting one or several dimensions, the sampling related restrictions on data recording can be circumvented and the time needed to record spectra with high dimensionality drastically reduced. A G-matrix transformation turned out to be crucial for recovering multidimensional spectra.

Eriks Kupče and Ray Freeman developed efficient procedures based on projection-reconstruction techniques for speeding-up multi-dimensional NMR. A novel reconstruction algorithm based on the inverse Radon transform is an essential part of the new procedure. Another proposal by them is to utilize the Hadamard concept for fast multi-dimensional spectroscopy.

Rafael Brüschweiler invented Covariance NMR Spectroscopy where the speeding-up of multi-dimensional NMR results from the conversion of a time-domain matrix into a covariance matrix which is submitted to a covariance analysis that identifies correlated changes of magnetizations. The technique has proven beneficial for the high-sensitivity recording of ^{13}C - ^{13}C spectra and of multiple-quantum correlation data.

Seminal papers:

S.Kim and T.Szyperski, *GFT NMR, a new approach to rapidly obtain precise high-dimensional NMR spectral information*, J.Am.Chem.Soc. **125**, 1385-1393 (2003).

H.S.Atreja and T.Szyperski, *G-matrix Fourier transform NMR spectroscopy for complete protein resonance assignment*, Proc.Natl.Acad.Sci.USA, **101**, 9642-9647 (2004).

E.Kupce and R.Freeman, *Fast multi-dimensional Hadamard spectroscopy*, J.Magn.Reson. **163**, 56-63 (2003).

E.Kupce and R.Freeman, *Projection-reconstruction technique for speeding up multidimensional NMR spectroscopy*, J.Am.Chem.Soc. **126**, 6429-6440 (2004).

R.Brüschweiler and F.Zhang, *Covariance nuclear magnetic resonance spectroscopy*, J.Chem.Phys. **120**, 5253-5260 (2004).

N.Trbovic, S.Smirmov, F.Zhang, and R.Brüschweiler, *Covariance NMR spectroscopy by singular value decomposition*, J.Magn.Reson. **171**, 277-283 (2004).

F.Zhang and R.Brüschweiler, *Indirect covariance NMR spectroscopy*, J.Am.Chem.Soc. **126**, 13180-13181 (2004).

2007 GÜNTHER LAUKIEN PRIZE – CALL FOR NOMINATIONS

The nominated work should be published within the last three years. In some special cases, the award may be for cumulative achievements over a longer period.

Nominations should include the following and be submitted by October 31:

1. Name of nominee, the nominee's affiliation, address, phone, fax and e-mail.
2. Name of nominator, address, phone, fax and e-mail.
3. A brief (no more than 200 words) description of the work serving as the basis for the nomination.
4. A list of relevant publications (no more than 5).

Send to: ENC LAUKIEN PRIZE, 2019 Galisteo Street, Building I-1, Santa Fe, NM 87505 (USA)

