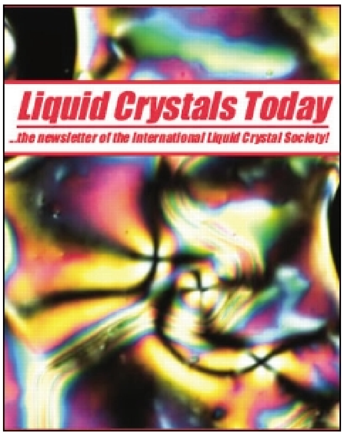

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The 2008 Fredericks medal goes to Noel A. Clark

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REPORT

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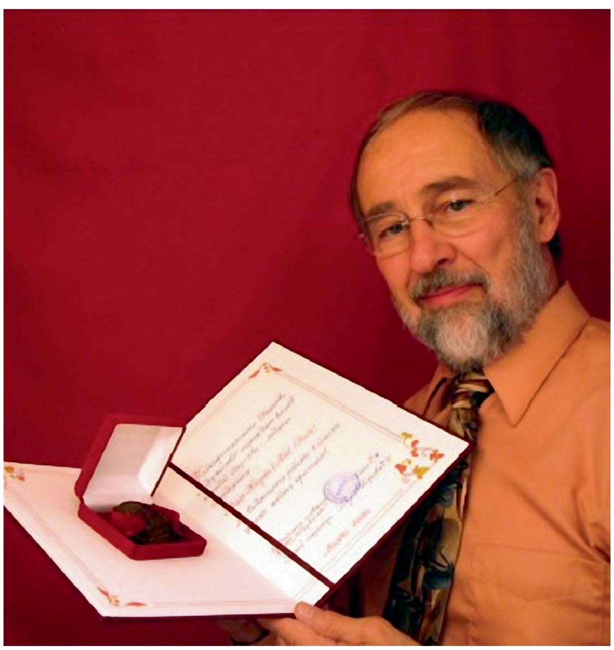
The prestigious Frederiks Medal was established in 1996 by the Russian Liquid Crystal Society to honour, in the name of Vsevolod K. Frederiks, active scientists whose discoveries have traced the path to liquid crystals science. The award is given, in alternation, to Russian and non-Russian physicist and chemists. Awardees include, among others, Valery Shibaev, Lev Blinov, Alfred Saupe, and Sven Lagerwall. Every 4 years the Frederiks Medal is granted to a non-Russian physicist. The 2008 Medal has been awarded to Noel A. Clark of the University of Colorado in Boulder.



Noel Clark started his career in Harvard in 1970, where he stayed for seven years, first as a research fellow and later as junior faculty. He moved to Boulder in 1977 where he is currently Professor of Physics at the University of Colorado. Clark has worked in many areas of soft condensed matter physics, his main focus being liquid crystals and colloids. Overall, Clark's work is the most cited among experimentalists who have worked in liquid crystals.

Clark's name became well known after 1980, when he demonstrated, in collaboration with Sven Lagerwall, bistable switching in surface-stabilised ferroelectric smectic phases, a discovery that led to the corresponding patent, the most-cited in the history of liquid crystal research, and which was described in an article that has so far obtained more than 1700 citations.

Clark's activity, however, had, at that time, already produced new important contributions. In the late 1970s he was the first to conceive and produce a freely-suspended liquid crystal film, a construct that has been crucial to investigating the structure and interactions of topological defects in two-dimensional systems and to deciphering, throughout the following years, the molecular order of many new liquid crystal phases.

In collaboration with Bruce Ackerson, Clark has given contributions of key importance in colloidal science. In the mid 1980s they proposed 'laser-induced freezing' to hold colloids in spatially-ordered locations by interfering laser beams, a technological precursor of the laser tweezer.

Clark has also worked on the structure of chiral lipid bilayers – describing and explaining the formation of hollow lipid microtubles – and of lyotropic lamellar phases – describing the fluctuation-mediated interactions among the bilayers.

In 1984 and 1985 Clark founded two separate companies, both of which are currently active. One of them is Displaytech, Inc., currently the world's leading maker of ferroelectric liquid crystal devices and materials.

I have had the honour of collaborating with Clark on two of his many research topics. Starting from the early 1990s, we studied, with the support of other colleagues, the phase behaviour and the structural and dynamic features of liquid crystal ordering in the complex confining environment of random porous media, such as silica aerogels. This work was part of the more general field of quenched disorder in condensed matter systems, which attracted much interest during that decade.

In the last three years, we have discovered the remarkable self-assembly of ultrashort fragments of DNA, in which oligometric duplexes assemble in living polymers and order into liquid crystal phases. Clark has proposed this supramolecular organisation as a possible route for the emergence of long polymeric molecules in the early Earth, overturning the common wisdom about nematic alignment of long DNA

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molecules. It has long been acknowledged that since DNA is a long and rigid molecule, it forms liquid crystals. We should maybe start thinking that since DNA fragments were able to order into liquid crystals, DNA long molecules could emerge as the life information-carrying polymer.

During recent years, Clark has also performed a sequence of masterful investigations leading to the decipherment of the complex phases and structures displayed by systems of bent-core liquid-crystalline molecules. This has been done through the combination of observations in freely suspended films with other classic soft-matter experimental techniques, such as x-ray scattering, light microscopy and freeze-fracture electron microscopy. The unveiled variety of structures of these compounds is really impressive. Among the many findings, a quite remarkable one is the emerging of chiral structures from achiral molecules through spontaneous symmetry-breaking.

Noel Clark has thus opened new ways in many areas of soft condensed matter. He is a living demonstration that soft matter is indeed a coherent discipline that relies on a unified core of notions, perspectives, and approaches. An impressive trademark of Clark's work is the combination of complementary experimental approaches and theoretical insights. Clark's works demonstrate an unrelenting quest after the essence of phenomena, which he was so often able to find in the combination and competition of the very basic properties of condensed matter, such as symmetries, length scales, dynamics and energy amplitudes.

The attribution of the Frederiks Medal to Noel Clark is a beautiful occasion that the Russian Liquid Crystal Society is offering to the scientific community to acknowledge the impressive advancement to knowledge that we owe to one of the most insightful soft matter scientists. We gladly celebrate.

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July 17, 2009