The series of Conferences on Liquid Crystals (CLC) is organised by the Institutes of Applied Physics and Chemistry of the Faculty of Advanced Technologies and Chemistry at the Military University of Technology (MUT) in Warsaw. About 40 years ago, this series started as the largest conferences on liquid crystal (LC) science in Poland, but at least after first two decades of continuation, this series can be regarded as one of important international conferences providing a highly competitive forum in the field of LC research and applications. It can be considered from the number and quality of contributions presented by participants from prestigious institutions of the world.

The last 21st CLC was held from 18th to 23rd September 2016 in Krynica-Zdrój, a small town established in the 16th century, located in the south part of Poland, very close to the Polish–Slovak border. This beautiful health resort was attended by 106 scientists from 14 countries, not only from Europe but also from US, Brazil, Japan, South Korea and India. The Conference covered all aspects of LC chemistry, physics and applications.

The welcome reception was opened by Prof. Wiktor Piecek, the chairman of CLC. After the opening ceremony, W. Piecek thanked the professors who have made a huge contribution to the field of LCs in Poland: Roman Dąbrowski, Jan Jadzyn, Wojciech Kuczyński, Stanisław Urban and Józef Żmija (Figure 1).

The first session was opened by Krzysztof Czupryński, the Vice Rector for Scientific Affairs of MUT (Figures 2 and 3).

The Scientific Committee with Prof. W. Piecek as a chairman for the first time decided to include four tutorial lectures to the programme. It appeared as a lucky choice, namely due to a proper selection of subjects and speakers.

Prof. J.P.F. Lagerwall (University of Luxemburg) in his tutorial lecture on polarised light microscopy outlined relations of the LC structure and the optical effects seen in the polarised microscope (Figure 4). He clarified, which information can be extracted from the colours appearing in the LC sample and explained some anti-intuitive optical phenomena. It was useful not only for students but also for all who use the polarizing optical microscopy as the first check of the LC structure and texture.

The tutorial lecture of Prof. D. Pociecha (Warsaw University, Poland) provided information on the use of X-ray diffraction for detailed unambiguous determination of LC structures. He analysed the use of both diffraction peaks and signal intensities to establish the crystallographic unit cell parameters and the electron density distribution within the unit cell. He also showed that the X-ray diffraction enables studies of critical phenomena associated with phase transitions between the LC phases.

Prof. K. Neyts (Ghent University, Belgium) explained the behaviour of different types of light beams (plane waves, Gaussian beams, light emitted by an antenna) in different LC configurations: in a volume, in a layer of material, in a fibre or interacting with a single molecule (Figure 5). Such knowledge is namely important when considering optical applications of LC elements.

Prof. P. Kula (MUT, Warsaw) presented a fascinating world of design and synthesis of complicated organic molecules which could exhibit new LC structures and properties or meet the requirements of specific applications. The lecture was intended even for non-chemists showing complex relations which are connecting the LC’s material research with development of synthetic methods and with materials requirements from the LC’s devices.

Eleven invited and 23 oral lectures were selected by the Scientific Committee to meet the Conference intention to cover all aspects of LC chemistry, physics and applications with the emphasis on hot topics.

In numerous talks and posters, new LC materials or materials with specific properties for selected applications were presented. Quite interesting was the talk by Prof. P. Kaszyński (Łódź, Poland), who introduced new LC materials based on discotic molecules in a specific supramolecular architecture exhibiting interesting magnetic behaviour.

Several talks concerned the study of physical properties, namely in the vicinity of the phase transitions. Prof. M.A. Das (West Bengal, India) presented a study of critical behaviour at the phase transitions in LCs by using high-resolution birefringence measurements. New findings in pattern formation in nematics under superimposed ac and dc fields were described by Prof. N. Eber (Budapest, Hungary).

New phenomena with definite application potential were presented in a series of invited and oral talks, as
well as posters. Amongst others, one can stress a ‘quasi-
smectic (Sm) A phase’, prepared from the bulk SmC
structure under specific boundary conditions, which
exhibits fast in-plane switching in submillisecond
region (Dr. A. Mochizuki, Louisville, KY, USA) or a very
promising method presented by Prof. I. Moreno, (Elche,
Spain) allowing encoding of arbitrary polarisation dif-
fraction gratings onto two orthogonal states of polar-
isation, by using an optical architecture based on an LC
spatial light modulator.

Prof. V. Reshetnyak (Kiev, Ukraine) presented concept
of mechanically, electrically and magnetically tunable
LC lenses as well as theoretical modelling for various
such configurations.

The design and investigation of various types of LC
composites is still in a focus of LC research. In invited
talks, doping of LC materials with nanoparticles, nano-
tubes or quantum dots is generally treated (Prof. R.
Manohar, Lucknow, India), or doping with ferromag-
netic particles (Prof. P. Kopčansky, Kosice, Slovakia), or
opposite, LC microdomains dispersed in a polymer
matrix (Prof. A. Glushchenko, Colorado Springs, CO,
USA). The doping with ferroelectric or metallic nanopar-
ticles or quantum dots appeared also in several oral or
poster presentations.
Very impressive were the applications of LCs in biology and medicine. Prof. M. Geday (Madrid, Spain) presented a possibility to detect microbes, e.g. in food or in water by using lyotropic LCs, together with details of realisation of such a device, Dr. M. Trzyna (Warsaw, Poland) informed on a new simple apparatus enabling to detect breast cancer employing the thermographic effect, and Prof. W. Piecek (Warsaw, Poland) on a method for analysis of breath.

During the conference, the meeting of Polish Liquid Crystal Society (PLCS) was arranged to discuss the future plans of the Society. Society members deliberated about the place and time for the next CLC, as well as about the place and time of next annual PLCS scientific meeting.

Under auspices of PLCS, the competition for the best poster or oral presentation prepared and presented by students was carried out. Two equal prizes were awarded: the poster presentation entitled ‘Polarization properties of photonic structures based on liquid-crystalline blue phase’ prepared and presented by PhD student Kamil Orzechowski from Faculty of Physics, forenoon. Most of the Warsaw University of Technology; and poster presentation entitled ‘Behavior of cholesteric liquid crystalline microcapsule with self-assembled anisotropic magnetic aggregate’ by PhD student Yosuke Iwai from Graduate School of Engineering Science, Osaka University.

Two optional excursions were proposed for the Wednesday forenoon. Most of the participants chose the excursion to Heritage Park in Nowy Sącz (Figure 6). Many old wooden buildings (huts and cottages), old churches and old orthodox churches from south-east part of Poland were moved to this place, to save them from destruction. In this place, visitors can also learn how life looked 100–200 years ago. Nineteen of the conference participants chose the excursion to Jaworzyna top (Figure 7). They used a cable car to enter the top and then they climbed down amongst pine woods. Finally, they returned in a good condition.
During the last session, the conference was summarised by Prof. M. Glogarova (Prague, Czech Republic). After closing remarks, the conference was closed by Prof. P. Perkowski, the co-chairman of the CLC.

The CLC series providing for participants full board in a nice comfortable environment, together with the hospitality of the hosts, makes these conference quite specific and attractive. It creates opportunity for non-formal scientific discussions and for fixing new contacts and collaborations.

To conclude, I wish to express my sincere thanks, namely to chairmen and co-chairmen of both Organising and Scientific Committees, J. Zieliński, W. Pieccek, P. Perkowski and M. Tykarska and to the others who contributed in organising this very successful and pleasant scientific conference.

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Figure 7. Conference participants during the climbing down from Jaworzyna Krynicka top.