“Every day I benefit from the method of thinking that I learned at LCI … it has been a great help.”
-Vincent Gu, Ph.D. ’09, Project Technical Lead, Apple Inc.
(Gu is one of nine CPIP graduates currently working for Apple Inc.)

With a doctoral degree in Chemical Physics at the Liquid Crystal Institute, you will:

- Participate in basic and applied research, with world-class faculty, in the emerging research areas of electro-optics devices, negative-index materials, liquid crystal beam steering, biological sensors, organic photovoltaics and nanotechnology just to name a few.
- Have the opportunity to publish in prestigious journals, present your research at international conferences and patent new technologies.
- Gain hands-on experience and knowledge in a variety of interdisciplinary scientific disciplines including physics, chemistry, mathematics and biology.
- Develop valuable critical-thinking skills that prepare you for challenging work with industry leaders.

“Our graduates are having a significant impact on the industry, and their success shows the value of education in the field of liquid crystals at Kent State.”
-Trustees Research Professor Oleg Lavrentovich, Ph.D.

P.J. Bos: Applications of liquid crystals, modeling of electro-optics of liquid crystals, surface alignment
L.C. Chien: Optical compensation films, liquid crystal alignment, liquid crystal/polymer composites, elastomers, electro-optical devices
A. Jakli: Ferroelectricity, piezoelectricity, electro-optics, dielectric properties, structured fluids, soft materials, thermotropic and lyotropic liquid crystals
T. Hegmann: Nanomaterials, nanoparticles, liquid crystals, doping, nanoparticle-suspensions and composites, optical and electro-optical effects, drug delivery, self-assembly
C. Kim: Colloids, emulsions, foams, rheology, micro rheology, cell and bio mechanics, cell rheology, complex fluid, dynamics of polymer, lipids, membranes, and monolayer
S. Kumar: Biaxial LCs, bent-core, lyotropic, and elastomer LCs, LC alignment, high-resolution x-ray and neutron scattering, electro-optical applications of LCs, LC biomaterials, and nanoscale structures
O.D. Lavrentovich: Electrophysical effects, topological defects, three dimensional imaging, lyotropic chromonic liquid crystals, colloids, biosensors, nanostructured materials, electrophoresis and dielectrophoresis
P. Palffy-Muhoray: Lasing and photonics in liquid crystals, negative index materials, liquid crystal elastomers, pattern formation and materials failure
J.V. Selinger: Theory of thermotropic and lyotropic liquid crystals, polymers, elastomers, nanoparticle suspensions, self-assembled lipid microstructures, and related biological materials
R.L.B. Selinger: Soft condensed matter theory and simulation; simulation studies of fracture and plasticity of solids
Q.H. Wei: Nanobiophysics, nanophotonic, micro/nanofluidics, nanophotonics, biophysics, soft condensed matter physics, materials with novel structures/properties and micro/nanofabrication
D.K. Yang: Electro-optics of liquid crystal, liquid crystal/polymer composites, cholesteric and blue phases, liquid crystal displays
H. Yokoyama: Nanotechnology, liquid crystals, surface and colloid science, organic thin films and scanning probe technology

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Phone: 330-672-2654
At the 2011 “Winning the Future” forum in Cleveland, President Barack Obama highly praised liquid crystal technologies developed at Kent State University’s Liquid Crystal Institute and its spin-off companies.

Learn the basic and applied science of today’s hottest liquid crystal technologies!

Over its almost 50-year history, the Glenn H. Brown Liquid Crystal Institute has trained many specialists that currently work at innovative high-tech companies, from industrial giants such as Apple, Samsung, Corning, 3M, Motorola and Hewlett-Packard, to local beacons of innovation such as Kent Displays, AlphaMicron, CoAdna Photonics, Hana Microdisplay Technologies and Kent Optronix. Other graduates have become professors at leading academic institutions, entrepreneurs in new technology businesses and research scientists at some of the most well-known research centers in the world.

You use LCI technologies every day!

Chances are good that the cell phone or music player you may have in your pocket, and the television you last watched were all made with liquid crystal technologies developed here at Kent State. It might even have been designed or manufactured by one of our graduates.

FUTURE APPLICATIONS

Beyond display technology there are many more applications of liquid crystals.

Biomedical
Liquid crystal rubber is flexible and twists like an artificial muscle when exposed to light, heat, or electric fields.

Food Safety
Biosensors made with liquid crystals provide exquisite sensitivity to the presence of harmful bacteria.

Green Energy
Liquid crystal organic photovoltaic materials promise to improve the efficiency of solar energy conversion.

PROGRAM REQUIREMENTS

Doctoral and Master Degree students participate in basic and applied research topics with faculty including physical properties of liquid crystals, liquid crystal display and applications (Optoelectronics), theories and computer simulation of soft matter, synthesis and molecular design, lyotropic liquid crystals and membranes, nanoscience and nanofabrication.

Master Degree students are required to complete 30 credit hours of core/elective courses with thesis as an option. Students are required to complete 90 credit hours (60 credit hours of core/elective courses and 30 credit hours of dissertation) for a Doctoral Degree.

HTTP://WWW.KENT.EDU/CAS/CPIP

“At the 2011 “Winning the Future” forum in Cleveland, President Barack Obama highly praised liquid crystal technologies developed at Kent State University’s Liquid Crystal Institute and its spin-off companies. President Obama praised the Liquid Crystal Institute for its contributions to innovation and technology. The Liquid Crystal Institute has trained many specialists who work at innovative high-tech companies, such as Apple, Samsung, Corning, 3M, Motorola, and Hewlett-Packard. Other graduates have taken on leading academic positions, become entrepreneurs in new technology businesses, and contributed as research scientists to renowned research centers.

Learn the basic and applied science of today’s hottest liquid crystal technologies!

The Glenn H. Brown Liquid Crystal Institute, with nearly 50 years of history, has educated numerous specialists who have found employment at prestigious high-tech companies, from global giants like Apple, Samsung, Corning, 3M, Motorola, and Hewlett-Packard, to local innovators such as Kent Displays, AlphaMicron, CoAdna Photonics, Hana Microdisplay Technologies, and Kent Optronix. Furthermore, many graduates have assumed roles as professors at esteemed academic institutions, established their own businesses, or continued their academic pursuits as research scientists at top-ranking research centers across the world.

You use LCI technologies every day!

It is highly probable that the mobile device or music player you carry in your pocket, and the television you watched recently, were manufactured or designed with liquid crystal technologies developed at Kent State. These groundbreaking innovations may have been crafted or produced by one of our esteemed graduates.

FUTURE APPLICATIONS

Beyond their role in display technology, liquid crystal applications extend into numerous other domains.

Biomedical
Liquid crystal rubber exhibits flexibility and a mimicry of artificial muscle behavior when subjected to light, heat, or electric fields.

Food Safety
Biosensors created with liquid crystals possess remarkable sensitivity to harmful bacteria.

Green Energy
Liquid crystal organic photovoltaic materials promise to enhance the efficiency of solar energy conversion.

PROGRAM REQUIREMENTS

Doctoral and Master Degree students engage in research projects under the guidance of faculty members, specializing in areas such as the physical properties of liquid crystals, liquid crystal display and applications (Optoelectronics), theories and computer simulation of soft matter, synthesis and molecular design, lyotropic liquid crystals and membranes, nanoscience, and nanofabrication.

Master Degree students are required to complete 30 credit hours of core/elective courses with the option of a thesis. On the other hand, Doctoral Degree students have to fulfill a more comprehensive requirement, totaling 90 credit hours (60 credit hours of core/elective courses and 30 credit hours of dissertation).

HTTP://WWW.KENT.EDU/CAS/CPIP

Valerie feels that CPIP is a great place to combine her love of optics with her love of liquid crystals in a specialized program of study. After graduation, Valerie hopes to find a research-based position at a government-sponsored lab.

After being a research engineer in the LCD industry in China for six years, Shuang found CPIP as the pathway to resume his academic dream as it offers a unique blend of cutting-edge techniques and a broad spectrum of research across soft matter.

“Valerie Finnemeyer
CPIP Doctoral candidate

Meaningful Pathway
After six years of service in the LCD industry in China, Shuang discovered CPIP as the ideal route to revitalize his academic aspirations. CIP provides an exceptional combination of cutting-edge techniques and extensive research into soft matter.

Christopher Bailey
Materials Engineer II, SAIC
Ph.D. 2008

The great thing about being a CPIP student is that you have the opportunity to gain experience in not only theoretical and experimental physics, but also chemical synthesis and device applications—all in the relatively short time it takes to earn your doctoral degree.”