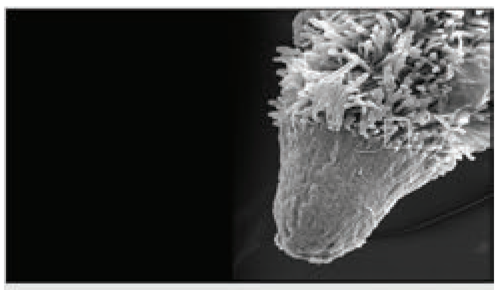
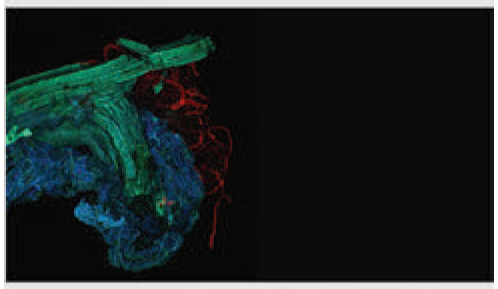
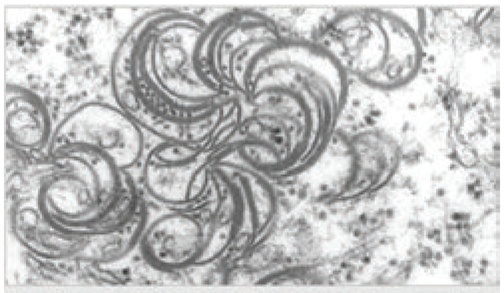


Potato root - Fran Leggett
Researcher Fran Leggett used a scanning electron microscope to image a potato root to see if they could find really small amounts of bacteria while studying blackleg disease in potato. "We were able to distinguish the disease agent earlier than it would normally be detected," says Fran.



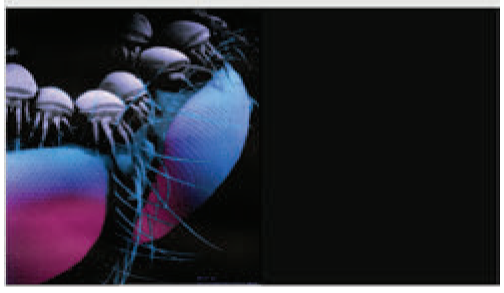
Potato root - Fran Leggett

Parasitic wasp - Byron Lee
Parasitic wasps are very tiny. They can be used for biocontrol (often for livestock insects). They lay eggs in the pupae of other insects. When the wasp eggs hatch in the other insect, the larvae feed on (and kill) the insect.

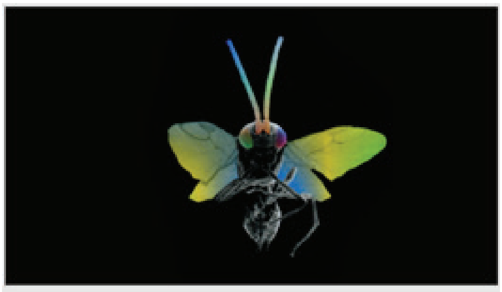


Potyvirus pinwheel inclusions - Fran Leggett
Houndstongue is a plant that was accidentally introduced on the prairies and has become a big problem on rangeland in Alberta. The seed is like a bur with little spokes and that clings to animals and clothing. A scientist found some diseased plants and wanted to know what was causing the disease. When they magnified it, they discovered it was loaded with viruses. The pinwheel pattern you see is caused by a potyvirus. Viruses can cause particular patterns or 'inclusions' - so once you see this you know you which type of virus you have.

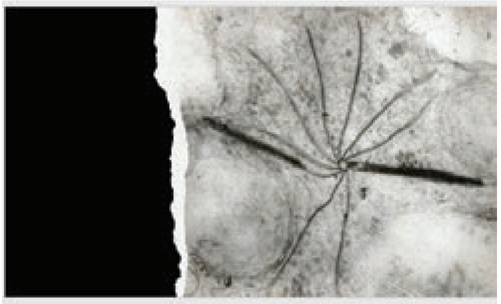
Praying mantis - Byron Lee
macrophotography



Black fly and mites - Byron Lee
This highly magnified image of a black fly reveals mites on its eyes.

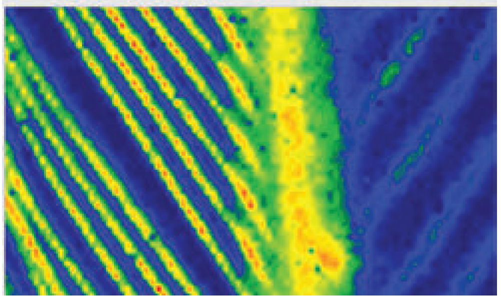


Wasp 2 - Byron Lee

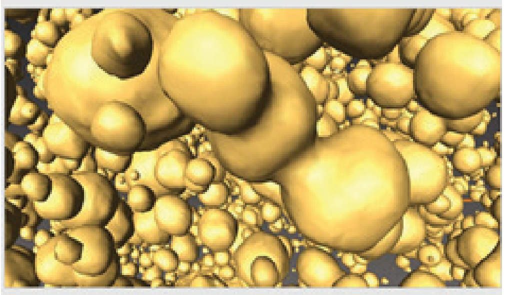


Potyvirus 2 - Fran Leggett

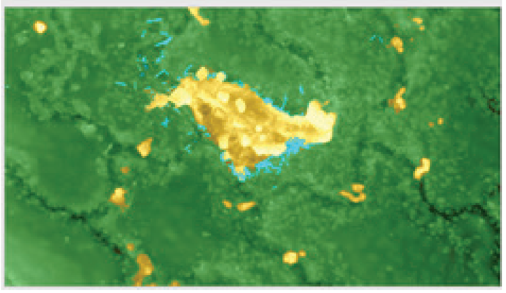
Bee - S. Prager (U. of Saskatchewan).
Researchers from the University of Saskatchewan and the University of California used the Canadian Light Source to study metal pollution in the environment to understand how this might be harming animals like bees.



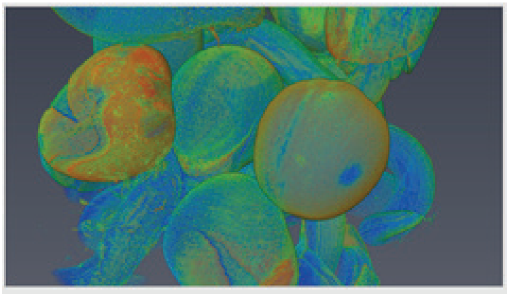
Bird feather - F. Akhter (Environment and Climate Change Canada, USask).
Ecologists are increasingly using feathers to measure exposure to toxic metals in the environment. Since feathers are replaced seasonally, they can provide insight into the changes in environmental toxins directly, without any harm to the animal. This image, produced at the CLS, shows the level and distribution of zinc in the feather of a bird fed a high-zinc diet.



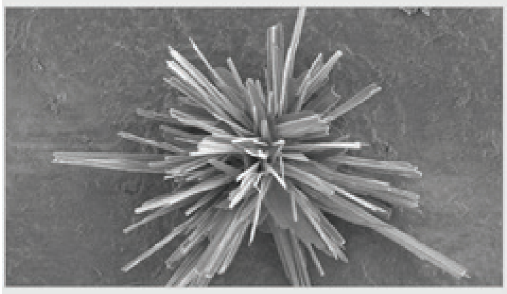
Bread bubbles - X. Sun (U. of Manitoba)
Researchers used the CLS to study how decreasing the amount of salt in a bread recipe changes the tiny bubbles that form in dough. They found there are fewer bubbles in samples made with higher water content and shorter mixing times. This image shows bubbles in a sample of bread dough.



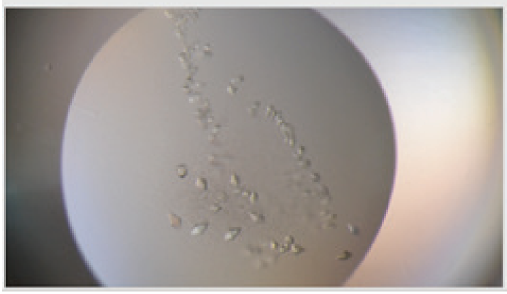
Cactus Leaf surface - CLS
Electron microscope image of the surface of a cactus leaf, showing the presence of salt crystals, bacteria, and wax platelets.



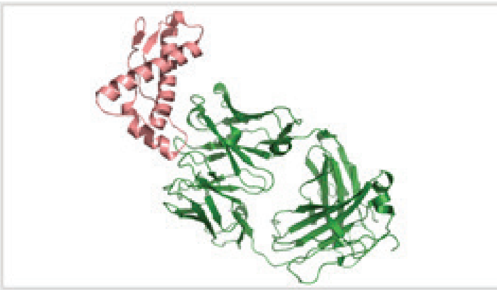
Canola seeds - CLS
Synchrotron imaging was used to capture canola seeds in the middle of germination. The emerging plants can be seen breaking through the shells of the seeds to search for water and nutrients.



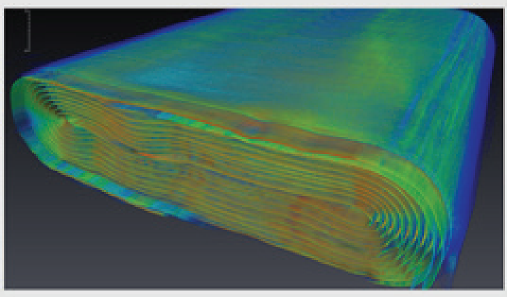
Copper catalyst - P. D. Luna (U. of Toronto; Canadian Institute for Advanced Research)
Researchers are using the CLS to develop processes for converting CO_2 into useful products such as plastic. The image shows the surface of a nanostructured copper catalyst that converts CO_2 into ethylene. Ethylene is used to make polyethylene—the most common plastic used today—whose annual global production is around 80 million tonnes.



Crystals 1 - S. D. Workman (U. of British Columbia).
Scientists are working to design better versions of the drugs used to fight antimicrobial-resistant germs like the deadly hospital-acquired superbug MRSA. The team used Canadian Light Source (CLS) to image how potential antibiotic-enhancing drugs interact with a molecule vital for building the cell wall of bacteria.

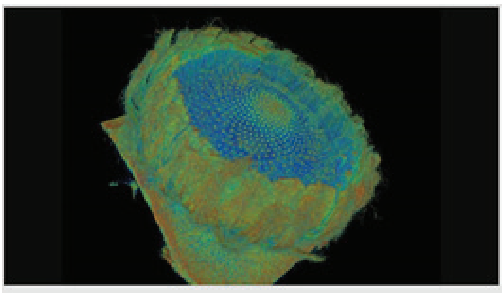


Deer prion protein - T. Bond (CLS).
Chronic Wasting Disease (CWD) in deer and elk, like Bovine Spongiform Encephalopathy (BSE) in cattle, is caused by the misfolding of a mysterious class of proteins known as prions. University of Alberta scientists used the Canadian Light Source to develop three-dimensional structures of the prion molecules to understand its function. A treatment for prion disease would be a vital safeguard for Canadian farmers.

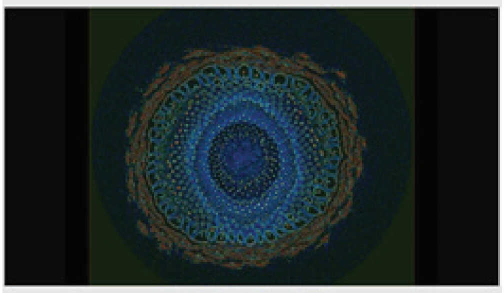


Exploding batteries - T. Bond (CLS).
This CT scan shows the internal structure of a lithium-ion battery, where layers of electrode materials are wrapped around each other in a "jelly roll" structure. Scientists at the CLS use these scans to track how these electrode structures change over time as the batteries age and degrade.

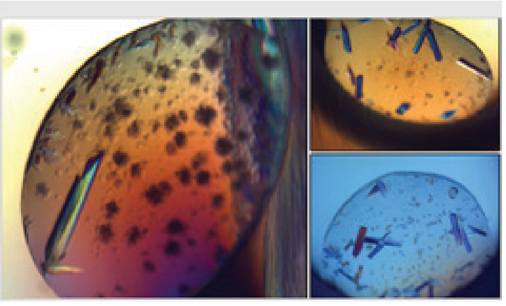
Fluorescent probes - K. Davis (Emory U.)
Researchers are using the CLS to study fluorescent probes, molecules that could one day be used to detect and treat neurological disorders like Alzheimer's and epilepsy. They have developed a number of first-of-their-kind probes in the form of "Frankenstein-ed" protein molecules, which consist of one part that binds a molecule of interest and another which translates that binding into a change in the length of time the fluorescence lasts (called fluorescence lifetime). This image shows crystals of one of the fluorescence lifetime sensors bound to its target, glucose.



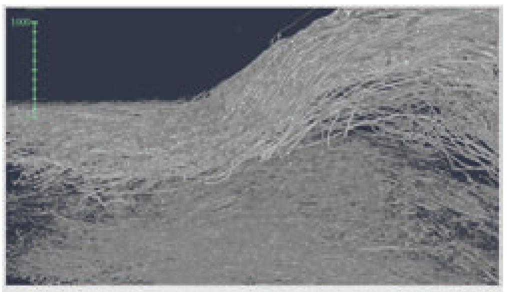
Gerbera Daisy 1 - T. Zhang (U. of Helsinki).
A Canadian Light Source computed tomographic image of a gerbera daisy head shows a complex structure composed of hundreds of flowers. Detailed understanding of plant development may advance methods for plant breeding, resulting in new varieties of ornamental plants and improved crops with increased yield.



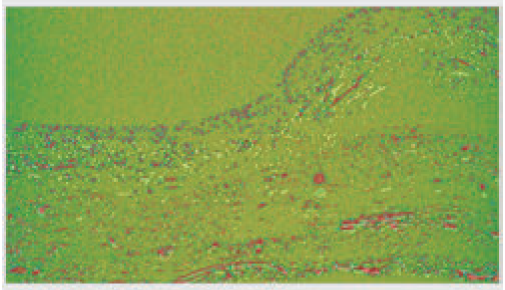
Gerbera Daisy 2 - T. Zhang (U. of Helsinki).
A Canadian Light Source computed tomographic image of a gerbera daisy head shows a complex structure composed of hundreds of flowers. Detailed understanding of plant development may advance methods for plant breeding, resulting in new varieties of ornamental plants and improved crops with increased yield.



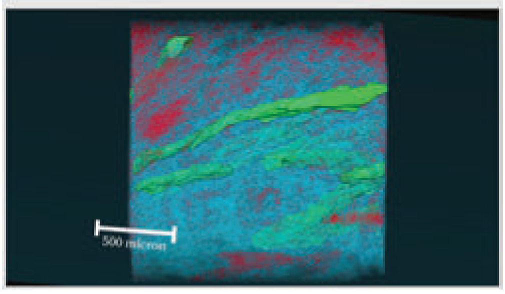
HIV - J. D. Cook (U. of Toronto).
Researchers are investigating key proteins on the HIV virus that are crucial to developing an effective vaccine. Micrographs of crystals from this project were diffracted at the Canadian Light Source.



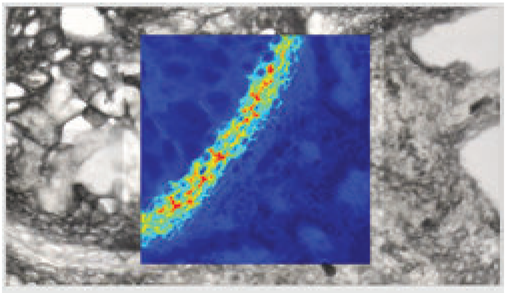
Mask 1 - T. Bond (CLS).
A Canadian Light Source-led study aimed to better understand how decontamination procedures affect the structure and potential reuse of N95 masks, which are used to protect frontline healthcare workers.



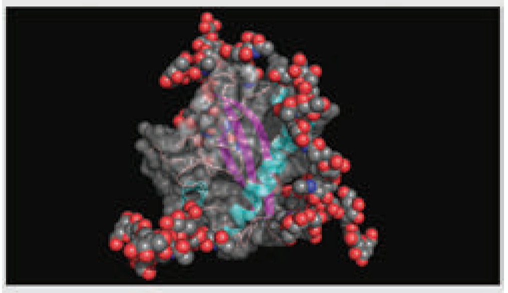
Mask 2 - T. Bond (CLS).
This image shows the internal microstructure of an N95 mask before (green) and after (red) being placed in a warm, humid decontamination chamber. These images were taken using microscopic CT scans at the Canadian Light Source that capture how fibers in the mask rearrange themselves when exposed to warm, humid conditions.



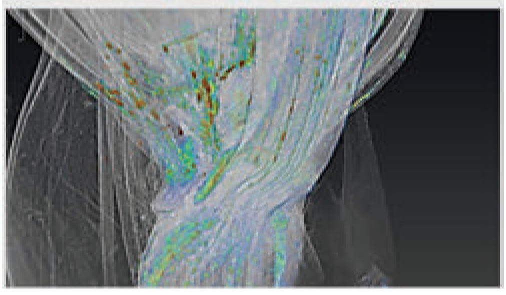
Meat fibres - A. Marangoni (U. of Guelph).
Researchers with the University of Guelph are using synchrotron light at the Canadian Light Source to develop vegan alternatives to meat and cheese. The group used the Canadian Light Source to analyze the microstructure of their prototypes.



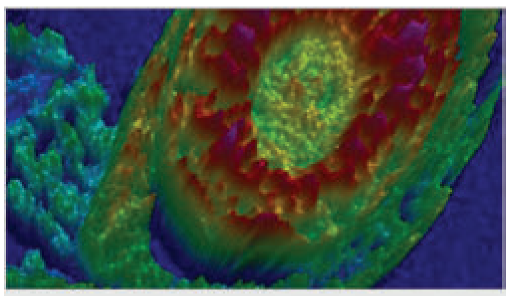
Norway Spruce - CLS
Dormant buds play a key role in preventing freeze damage to trees. Studying their composition will reveal how they help Norway spruce (Picea abies) trees survive cold winters. This synchrotron image shows localization of pectin in a Norway Spruce bud.



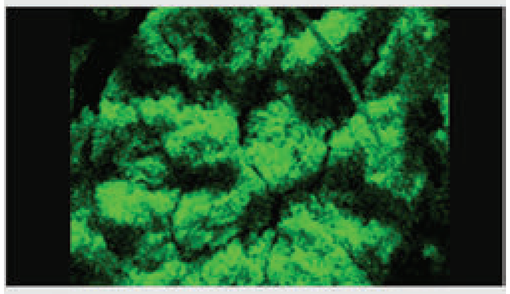
Ovarian cancer research - B. White (California State U. Fresno)
A protein called mucin is altered in ovarian cancer cells. This change helps the cancer grow and spread, but also leaves a signal that could serve as a target for treatment. Synchrotron imaging provided this snapshot of antibodies binding to the protein.



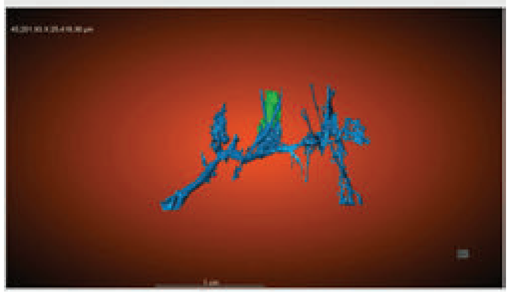
Phase contrast X-ray image of wheat spike - CLS
Using a synchrotron to image plants is minimally invasive but yields high spatial resolution, which is critical for studying the mechanisms behind plant growth and development. And the new knowledge gained helps inform advances in crop performance and productivity to meet global needs. The highlighting in this image shows the vascular system in a wheat spike.



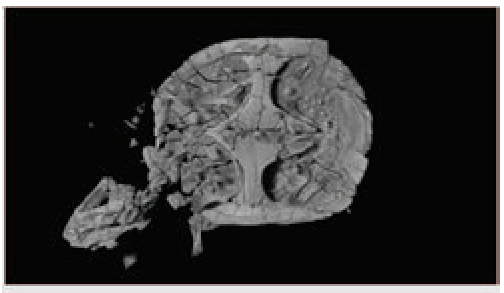
Carnation seed map - CLS
This map of a carnation seed germ helped researchers identify where various constituents (like protein, lipids and carbohydrates) where located in the carnation seeds, in order to figure out how to effectively separate them, and ultimately use them as ingredients in products.



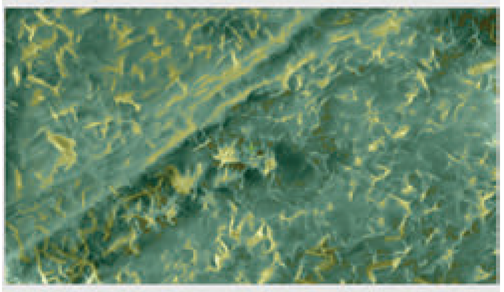
SEM cross-section image of a used battery electrode particle - B. Barlow, J. Zhou, J. Wang (CLS)
A cross-section image of an electrode particle from a used battery. The information gained from this image helps improve our understanding of the mechanism by which batteries degrade and over the long term could help lead to the development of longer-lasting batteries for electric vehicles.



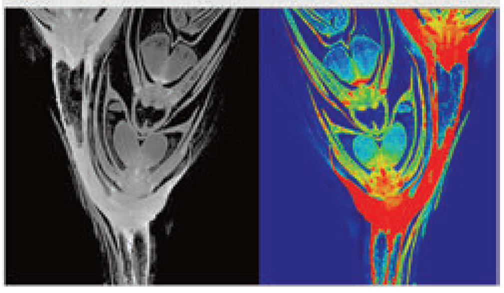
T-rex - M. Barbi (U. of Regina).
A team from the University of Regina and the Royal Saskatchewan Museum used the Canadian Light Source to analyze the rib bones of Scotty, the world's largest T. rex and may have uncovered unprecedented details in the fossils.



Turtle - D. Brinkman (Royal Tyrrell Museum of Paleontology, U. of Alberta)
A 66-million-year-old fossil of a turtle, found in Saskatchewan, was identified as a new genus and species. Researchers used the Canadian Light Source to take CT scans of the specimen.



Wheat Leaf underside - CLS
The Canadian Light Source' Environmental Scanning Electron Microscope was used to image of underside of a wheat leaf, showing a distribution of wax particles. The aim of the study is to determine the effects of drought on the shape, size, and distribution of the particles.



Wheat 320 - CLS
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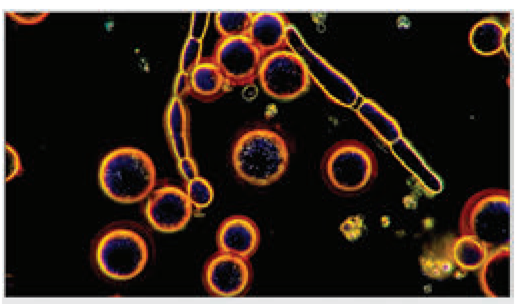
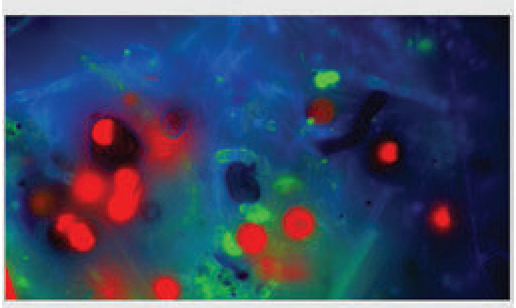
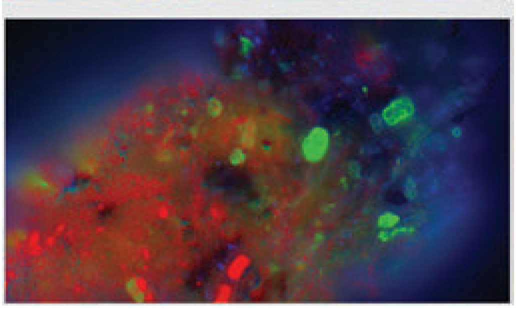


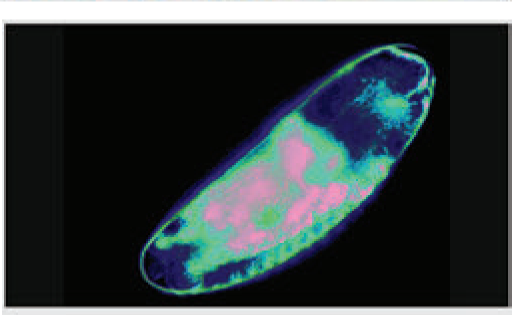
Yeast-like organisms - Zack Belak/Proxima R&D
A darkfield microscope image of an assortment of yeast-like organisms isolated from a basil flower. This image illustrates the amazing variety of microorganisms that are present all around us and the hidden world inside everyday things.



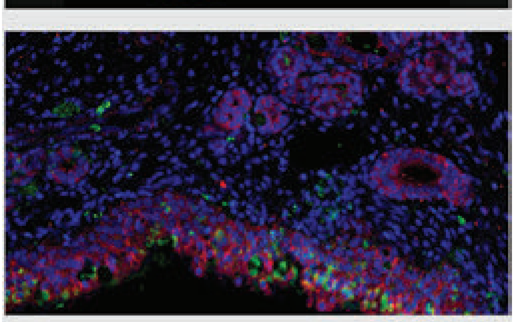
Fungi, algae, & bacteria - Zack Belak/Proxima R&D
A fluorescence microscope image of an assortment of fungi, algae, and bacteria isolated from pond water. String-like bacteria show up in blue while fungal cells appear green, and algae show up as red. This image illustrates the amazing variety of microorganisms that are present all around us and the hidden world inside everyday things.



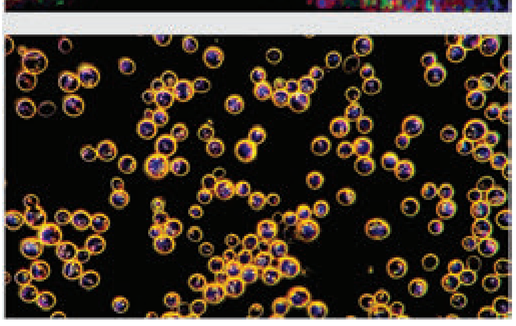
Fungi, algae, & bacteria- Zack Belak/Proxima R&D
A fluorescence microscope image of an assortment of fungi, algae, and bacteria isolated from pond water. Clusters of cells of a yeast-like fungus appear green while algae show up as red. This image illustrates the amazing variety of microorganisms that are present all around us and the hidden world inside everyday things.



Fly larva - Zack Belak/Proxima R&D
A fluorescence microscope image of a developing fly larva. The developing brain, eyes, and mouth are seen at the top right while the legs are beginning to form along the bottom edge of the larva. Delicate cloud-like structures inside the larva are the developing internal organs.



Nose - Zack Belak/Proxima R&D
A fluorescence microscope image of immune system cells in the lining of the nose. The red cells are responsible for secreting mucous to protect the tissue and help flush away infectious agents and debris. The green structures are immune cells which are concentrated in the tissue of the nose where they stand guard and provide a first line of defense against bacteria and viruses such as COVID.



Saccharomyces- Zack Belak/Proxima R&D
A darkfield microscope image of the yeast Saccharomyces cerevisiae used to brew beer including at the many excellent breweries right here in Saskatchewan. This humble fungus has been used by humans for over 6000 years for everything from beer and wine to bread and biofuels and is still the most widely cultivated and industrially important microorganism worldwide.