

Advanced Biomanufacturing Centre

Brock University

500 Glenridge Avenue
St. Catharines, Ontario, Canada L2S 3A1



Combining “two
solitudes”

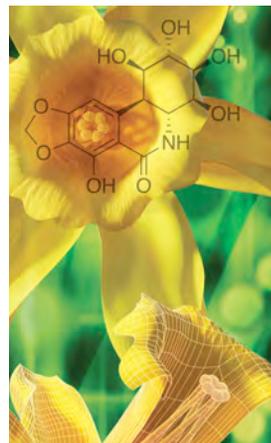
The Advanced Biomanufacturing Centre brings together expertise in biology and chemistry to uniquely tackle challenges.

Two disciplines, one goal.

The overall mission of the *Advanced Biomanufacturing Centre (ABC)* is the pursuit of new methods for the manufacture of medicinally important compounds, chemical building blocks, and new materials. In the future, petrochemicals for manufacturing will not be available. New ways to provide these building blocks will have to be discovered. The answers will come from the fusion of biology and chemistry that historically have existed as “two solitudes”, but which will now solve the supply problems for chemical manufacturing.

Biology provides methods for “programming” plants and other living organisms in order that they make specific chemical substances. Chemical methods transform such building blocks into more complex products, ranging from pharmaceuticals to materials required by society.

Brock and Niagara have the infrastructure to exploit the results of this work. New companies and existing companies will come to Niagara to benefit from the commercial potential of the work accomplished in the ABC. The Cairns Family Health and Biosciences Research Complex and its business incubator, coupled with participation of the Office of Research Services and its Director of Business Development and Commercialization, together with the Greater Niagara Chamber of Commerce, provide the critical mass to support and exploit this opportunity. This Centre combines transdisciplinarity, creativity, commercialization opportunities, and regional context.



Combining top-level researchers and state of the art facilities to generate industrially relevant intellectual property.

The Advanced Biomanufacturing Centre recruits the highest caliber graduate students and post-doctoral fellows to not only tackle existing industrial challenges but to also develop unique techniques and methodologies for commercialization. Researchers are members of a transdisciplinary team that works from the research labs at Brock University, BioLinc, and industrial facilities developing a distinctive blend of fundamental and applied science.

Fundamental science with an applied vision.

Enzyme-mediated cross-linking of silicone polymers. 2011, US 8,383,755

Flavonol expressing domesticated tomato and method of production. WO 2003105568 A2

Preparation of benzodioxole derivatives for treatment of influenza. PCT Int. Appl. (2011), WO 2011047466 A1 20110428

Processes for the preparation of morphinane and morphinone compounds. PCT Int. Appl. (2010), WO 2010121369 A1 20101028



Vincenzo De Luca, PhD

Our research program is aimed at genomic, proteomic and metabolic approaches to study the biosynthesis of plant natural products and their regulation.

Implicit in these efforts are techniques such as the metabolic pathway engineering of specialized cell factories for the commercial production of valuable natural products in plant cell cultures or in transgenic plants.

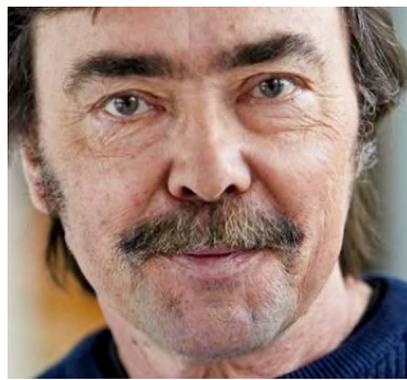


Charles Després, PhD

One powerful mechanism used by plants to ward off pathogens is called "induced resistance" and is described as the systemic broad-range long-lasting resistance to a pathogen that occurs after exposure of part of a plant to a microbe.

Current studies are focusing on:

a) Understanding the biochemical mechanisms by which NPR1 regulates gene expression; b) Deciphering the NPR1 signal transduction pathway in *Arabidopsis* using biochemical and proteomic tools; c) Engineering disease resistance in grapevine (*Vitis vinifera*).



Tomáš Hudlický, PhD

Our research program is devoted to several projects in asymmetric synthesis and the total synthesis of natural products. Two groups of alkaloids are targeted in the total synthesis effort: morphine, because of its analgesic properties, and pancratistatin, a powerful anti-cancer agent.

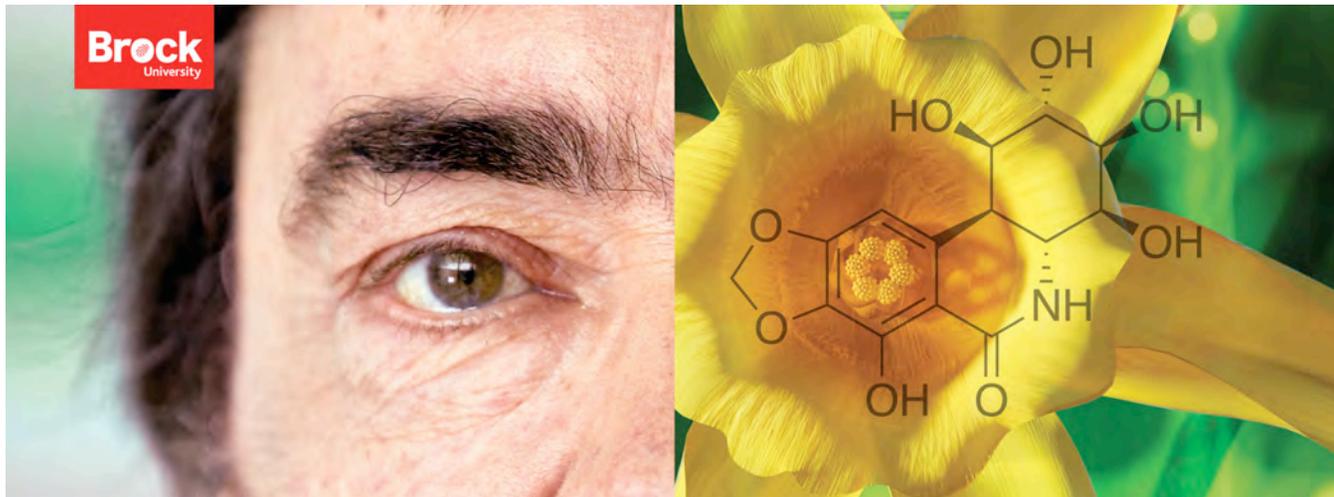
The key philosophy applied to all problems in our research group is the issue of efficiency and brevity because these parameters provide for less waste generation in manufacturing.



Paul Zelisko, PhD

Of particular interest to our group is the study of "green" methodologies in silicon chemistry which include exploring silicon biotechnology and reactions that can be performed in the absence of solvent, or performed in/on water.

Associated with these particular efforts are our interests in developing unique silicon-based delivery systems for both the topical and oral delivery of biologically active agents, aqueous silane-based anti-corrosion coatings for metal substrates, and silicon-based cork coatings for the wine industry.



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