

## **Ryerson University Establishes Global Leadership in Digital Cinema Including 3D In Its Digital Cinema And Advanced Visualization Lab**

Given its long history of education relating to the Canadian Film industry, it's not by accident that Toronto's Ryerson University is one of the worlds leading institutions in the study and development of Digital Cinema. Sitting amongst a number of Research Labs in Ryerson's Rogers Communications Centre is the Digital Cinema and Advanced Visualization Laboratory. The \$2.9 million, 1,600-square-foot lab dedicated to "Future Cinema" was established in 2006 by Dr. Abby Goodrum and Dr. Paul Hearty both research faculty at Ryerson University. Not only is it the first digital cinema lab in Canada, but it's also the first of its kind in the world. The cost of the project was covered by grants, Ryerson University and equipment donations.



Digital Cinema is a high-resolution medium that has up to four times the resolution of most HD television formats. It has been designed to replace Motion Picture Film and like most digital mediums it can be distributed via optical media, hard drives, networks and satellite. To be projected at a movie theatre Digital Cinema requires a digital projector and the projector has the added advantage of adding 3D projection wherever its installed.



What makes the lab unique is that the lab has been equipped and designed to study a wide range of digital cinema topics. The labs "all aspects" approach means it's equipped to study pre-production, post-production, distribution, audience response, repurchasing and repackaging for use and archiving. To achieve its aims the lab is equipped with an amazing array of technology that few organizations anywhere have been able to assemble.

The labs inventory includes a Sony SXR-D110 4K projector, a Red One 4K DCinema camera, two Dalsa Origin DCinema cameras, a Panasonic HVX-200 video camera, a custom made Unity Gain Stewart Screen, a 64 core Xeon render farm with a10GigE on frontend node, two Foundry Networks 8x10G 10GigE switches, a Force10 S2410 GiGE switch, two "Thumper" storage servers, two Apple XRaid 7TB Fiberchannel disk packs, one Canon 5D MKII camera, two Apple Mac Pro editing stations loaded with Red Rocket Accelerator cards and equipped with dual 30" Apple Cinema Displays, an Apple FileServer with Quad channel FC card, a Keisoku Giken UDR-20S digital 16-bit 4:4:4 4K Record/Playback system and two Nvidia Quadro Plex 2200 D2 external graphics engines with a total of four Nvidia QuadraFX 5800 GPU's.

The lab is also equipped for research in emerging areas such as 3D, 4K collaboration and advanced studies related to human perception. Technology in this area includes Cineform's Neo4K editing software and Neo3D real-time 3D editing software for MAC. For collaborative undertakings the lab is interconnected via a 10 GigE connection to CAVENET and a GigE connection to HPDMnet both via CANARIE. The lab is equipped with an UltraGrid conferencing PC, a Black Magic Decklink Extreme capture card, a Xena-HS Capture card and a sixteen port Avocent KVM switch.





To study the perception of emerging media generated by the lab, a Facelab 5.0 Facetracking system that includes an optional GazeTracker and Scene Camera system has been installed. Using Facelab researchers can study and monitor where the viewer's eyes are moving to and whether they're fixed on one area of the screen. This will allow researchers to assess viewer engagement by measuring human sensory, perceptual, cognitive and behavioral responses. This is an important area especially in 3D perception. Together these technologies provide a flexible research environment, a production studio, a screening room, an interaction laboratory and a digital library.

Under the direction of Dr. Paul Hearty, Ryerson became a founding member of CineGrid research consortium that included the University of California San Diego, the University of Southern California, and Keio University in Japan. CineGrid's research focuses on Digital Cinema networked collaboration over photonic networks like ORION and CANARIE.

In October 2007 the Digital Cinema and Advanced Visualization Laboratory participated in a world first. Using a "lightpath" provided by CANARIE, the Lab linked to its CineGrid partners in Prague and in San Diego. Footage from a 4K digital camera in Prague was transmitted over fibre optic links 10,000 km to San Diego for processing. The media was then instantly delivered to Ryerson via the "lightpath" for editing. This interconnection allowed for colour correction technology to operate in Ryerson's Lab in real time across the globe. The colour technician was able to follow the instructions of the Cinematographer and Director --who were physically located an ocean away in Prague-- effectively implementing changes to the film in real time.

The test proved the ability to collaborate globally in real time in the post production of digital cinema. Multiple parties were able to view and edit the same images from great distances away. The result of this demonstration is expected to bring a dynamic change to how films are produced. As a result of the demonstration Orion recognized both Ryerson University and the Digital Cinema and Advanced Visualization Laboratory with the prestigious Orion Discovery Award, confirming both the university and Toronto as a hub in this emerging digital, "Future Cinema" production environment.

The Digital Cinema Lab is housed in the Rogers Communications Centre, Ryerson's full-function adaptable communications facility. With 140,000 square feet, the Centre includes four television studios, including Canada's first four-camera HDTV studio, video and audio post-production stations and networked multi-media and print facilities. The backbone of the Centre is a state-of-the-art computer and communications network that connects studios, post-processing facilities, laboratories and multi-media and print facilities to centralized storage, processing and IT resources.



Ryerson Universities Rogers Communications Centre has been home to a number of innovations related to the development of both Digital Cinema and HDTV. These include;

- 2000 – Perfecte, Canada's first student produced HDTV drama.
- 2001 – Housed Canada's first tape based HDTV editing for which content was created for the country's first end-to-end 1080i broadcast in partnership with Vision TV.
- 2002 – Obtained seven HDTV cameras in schools and HDTV editing suites making it the largest HDTV implementation of that time.
- 2003 – Hosts Santa Fe High Definition Workshop, the first HDTV training of its kind in Canada
- 2003 – Opens two 1080i HDTV editing suites becoming Canada's first DVCPro 100 based non-linear editing suites employing Apple's Final Cut Pro software.
- 2005 – Constructs Canada's first four-camera, High Definition TV studio is constructed. It's among the first fixed multipurpose HDTV production studios in North America.
- 2006 – Constructs Canada's first Digital Cinema and Advanced Visualization Laboratory to study and develop a Canadian leadership position in Digital Cinema and 3D motion media.
- 2007 - World's first 4K transatlantic high-speed film production collaboration demonstration between Ryerson in Toronto, Prague and San Diego.
- 2007 - The Digital Cinema and Advanced Visualization Laboratory wins the prestigious Orion Discovery Award, confirming both the Rogers Communications Centre and Toronto as a hub in this emerging digital, "Future Cinema" production environment.
- 2008 – Constructs Canada's first educational editing facilities equipped with colour correction surfaces and grading monitors that span editing from HDTV through Digital Cinema.
- 2008 – Rogers Communications Centre co-hosts "4K Cameras, 4K workflows Conference" as the digital evolution shifts towards Digital Cinema.
- 2008 – Rogers Communications Centre obtains a Sony SXRDR110 4K projector, the first 4K Digital Cinema projector in the Canadian education system.
- 2008 - Rogers Communications Centre co-hosts the "International Digital Cinema Festival and Red One Symposium".
- 2009 – Launches world's first distributed IPTV 1080p HDTV networked launched to four displays in the Rogers Communications Centre.
- 2009 – Obtains two Dalsa Origin DCinema camera's allowing for 4K uncompressed Digital Cinema capture, the only 4K uncompressed Digital Cinema cameras in Canada's educational system.
- 2009 – Obtains a Red One 4K DCinema camera allowing for 4K Digital Cinema capture, the first in Canada's educational system.
- 2009 – Ryerson's Rogers Communications Centre becomes Canada's first educational institution equipped with the ability to edit 3D Digital Cinema through its acquisition of Cineform's Neo3D editing software.
- 2009 – Investments make the Rogers Communications Centre's Digital Cinema and Advanced Visualization Laboratory one of the world's best equipped Digital Cinema Labs

More information on the Rogers Communications Centre, the shared FCAD facilities it operates and the specifics of the labs that it operates can be found at

[www.rcc.ryerson.ca/technology/index.htm](http://www.rcc.ryerson.ca/technology/index.htm)