

Distributed Digital Music Archives and Libraries (DDMAL)

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Schulich School of Music

McGill University



Centre for Interdisciplinary Research
in Music Media and Technology

Research Infrastructure

- CIRMMT
 - McGill University
 - Schulich School of Music
 - Music Technology Area
 - DDMAL

CIRMMT

Centre for Interdisciplinary Research in Music Media and Technology

Six research axes:

- Sound modeling, acoustics, and signal processing
- Musical gestures, devices, and motion capture
- Musical information archiving and retrieval
- Multimodal immersive systems
- Music perception and cognition
- Expanded musical practice

CIRMMT

Centre for Interdisciplinary Research in Music Media and Technology

Schulich School of Music

- Music Technology Area
- Sound Recording Area
- Digital Composition Studio
- Music Education Area
- Music Theory Area

McGill Faculty of Science

- Department of Psychology
- School of Computer Science

McGill Faculty of Engineering

- Electrical and Computer Engineering

McGill Faculty of Medicine

- Montreal Neurological Institute

Université de Montréal

- Faculty of Music
- Faculty of Arts and Sciences (Psychology, Computer Science)
- BRAMS

Université de Sherbrooke

- Groupe d'Acoustique

McGill University

Schulich School of Music

Music Technology Area

- Professors
 - Philippe Depalle
 - Ichiro Fujinaga
 - Stephen McAdams
 - Gary Scavone
 - Marcelo Wanderley
- Post-docs (5)
- PhD students (18)
- Master's students (7)
- Honours undergrads (7)

McGill University

Schulich School of Music

Music Technology Area

- Sound Processing and Control Laboratory (SPCL)
- Computational Acoustic Modeling Laboratory (CAML)
- Input Devices and Music Interaction Laboratory (IDMIL)
- Music Perception and Cognition Laboratory (MPCL)
- Real-Time Multimodal Laboratory (RTML)
- Distributed Digital Music Archives and Libraries Laboratory (DDMAL)

Research Projects in DDMAL

Distributed Digital Music Archives and Libraries

- GEMM: *Laurent Pugin, John Ashley Burgoyne*
 - Gamut for Early Music on Microfilms
- jMIR: *Cory McKay*
 - Java-based Music Information Retrieval tools
- OMEN: *Dan McEnnis, Andrew Hankinson*
 - On-demand Metadata Extraction Network
- MAPP: *Catherine Lai, Damon Li*
 - McGill Audio Preservation Project
 - MAQ (McGill Audio Quality laboratory)
 - MIAC (McGill Image to Audio Conversion system)

GEMM

(Gamut for Early Music on Microfilms)

- Based on GAMUT (Gamera-based Automatic Music Understanding Toolkit) & ARUSPIX
- Possibility of OMR for music on microfilms
- Almost all old Western music are on microfilms
- Efficient digitization using automatic microfilm scanner (500ppm)
- Goal: Diplomatic facsimile
 - Geometrically accurate reproduction
 - Imitate fonts and handwriting style

jMIR

java-based MIR tools

- ACE (Autonomous Classifier Engine)
 - Meta learning framework
- jAudio
 - Feature extractor for audio data
- jSymbolic
 - Feature extractor for symbolic data
- jWebMiner
 - Cultural features extractor from web text
- jMusicMetaManager
 - Detect and correct erroneous metadata

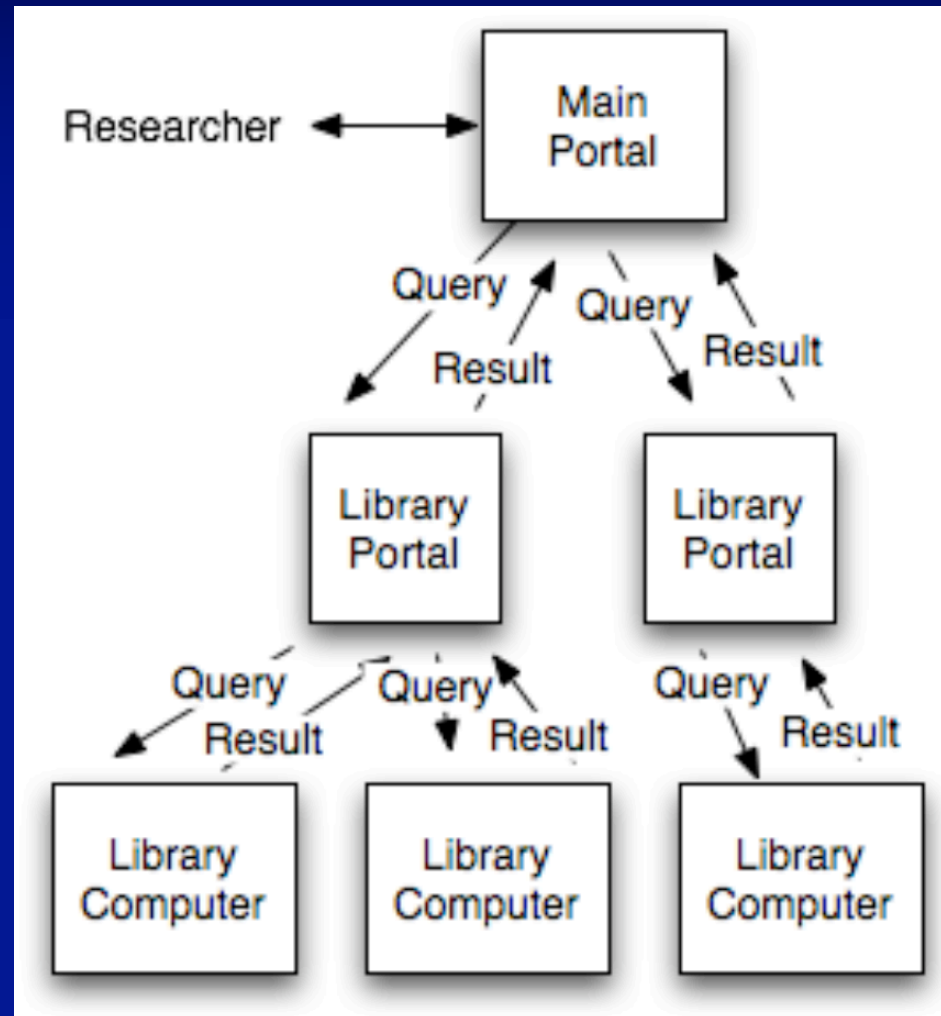


On-demand Metadata Extraction Network (OMEN)

- Musical features are metadata
- Metadata (XML) much bigger than audio files
- Audio files mirrored in several locations
- Under-utilized library computers
- Common features (metadata) cached
- L2L (library-to-library) protocol: currently implemented using servlets and JavaServer Pages (JSP)

OMEN Topology

- Master Node
- Library Node
- Worker Node



McGill Audio Preservation Project (MAPPP)

- Millions of LPs to be digitized
- Workflow management
- Document analysis
- Automatic metadata extraction
- Automatic track segmentation
- Recordings before 1957: Public Domain
- Pilot project: Edelberg Handel Collection

McGill Image-to-Audio Conversion (MItAC) System



White-light Interferometry Profiling Microscope



- Lateral resolution
 - 0.1 micrometer (μm)
- Vertical resolution
 - 0.1 nanometer
- v \$260,000 !

Surface Stats:

Ra: 7.68 μm

Rq: 8.81 μm

Rt: 31.18 μm

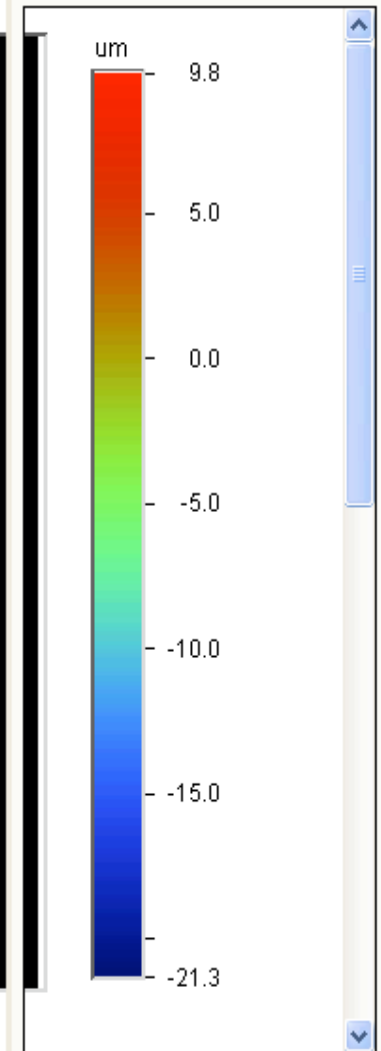
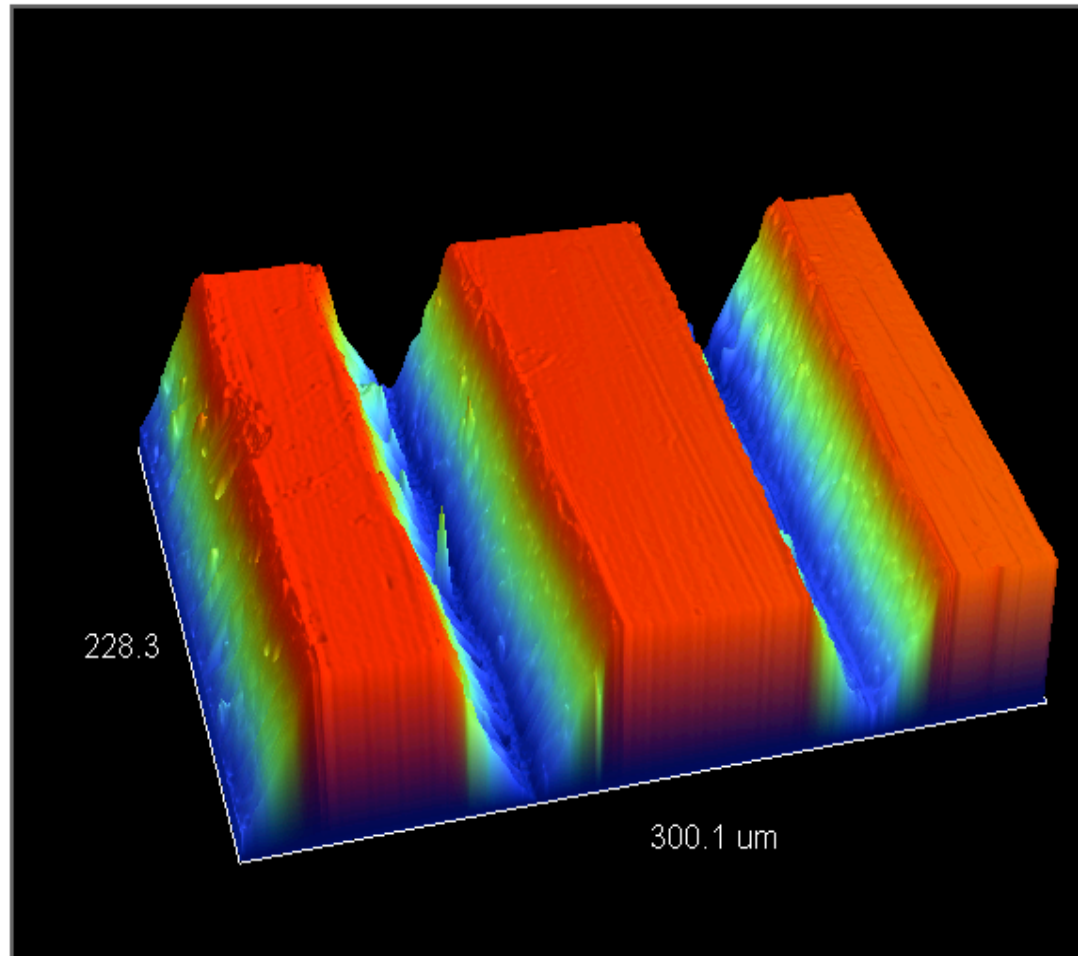
Measurement Info:

Magnification: 20.60

Measurement Mode: VSI

Sampling: 475.63 nm

Array Size: 480 X 736



Title: McGill University

Note: Red LP - Maximum Modulation

The world's slowest turntable

Time and space to scan one side of an LP

Resolution	Time (hours)	File Size (GB)
5x	61	44
10x	241 (10 days)	173
50x	6,251 (~ 8 months)	4,486
100x	24,743 (~ 3 years)	17,756

Upcoming Research

- Statistical sequential data analysis: *John Ashley Burgoyne*
- Pitch estimation in polyphonic vocal music to facilitate choral intonation modeling: *Johanna Devaney*
- Distributed name authority architecture for digital music libraries: *Andrew Hankinson*
- High-resolution time-frequency analysis: *Jason Hockman*

Introducing NEMA

- Network Environment for Music Analysis
- Mellon-funded three-year \$1.2M project
- Participants
 - UIUC (Downie)
 - McGill (Fujinaga)
 - Goldsmiths (Crawford)
 - Queen Mary (Sandler)
 - South Hampton (De Roure)
 - Waikato (Bainbridge)
- Technologies: jMIR, ACE XML, OMEN,...

Acknowledgements

