



# Microarrays at the NML; a Core Facility Perspective

Claude Ouellette

DNA Core Facility

National Microbiology Laboratory

Health Canada

3rd Montreal Microarray Symposium

19 March, 2004



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# Canadian Science Centre for Human and Animal Health



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# Canadian Science Centre for Human and Animal Health



 Health Canada Santé Canada

 Canadian Food Inspection Agency Agence canadienne d'inspection des aliments

NML

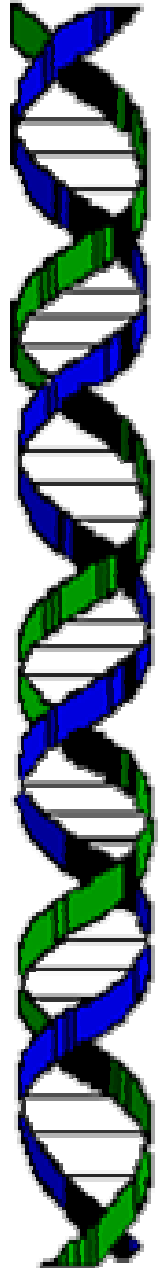
NCFAD



# NML consists of

- National Laboratory for Host Genetics and Prion Diseases
- National Laboratory for Enteric Pathogens
- National Laboratory for Zoonotics and Special Pathogens
- National Laboratory for Bacteriology
- National Laboratory for Viral Diagnostics





# National Laboratories

## Host Genetics and Prion Diseases

Dr. Stephanie Booth

- BMAP
- Mouse SV

Dr. David Knox

- Mouse Oligo Array
- Mouse AROS



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# National Laboratories

## Enteric Pathogens

Dr. Cliff Clark

- Multi-organism chip (*E. coli*, *Shigella*,  
*Campylobacter*, *Salmonella*)
- MWG Biotech *E. coli* pathogen chip



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# National Laboratories

## Bacteriology

Dr. Mike Mulvey

- *Bacillus anthracis*
- *S. typhimurium*
- *S. aureus*

Dr. Grant McClarty

- Chlamydia chip

Dr. Lai King Ng

- *N. gonorrhoea*

Joyce Wolfe

- Mycobacterium chip



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# National Laboratories

## Viral Diagnostics

Dr. Graham Tipples

- VZV SNP chip
- VZV expression

Dr. Natalie Bastien

- Influenza chip

Dr. Alberto Severini

- HSV-1
- HSV-2
- HSV-1 Oligo chip



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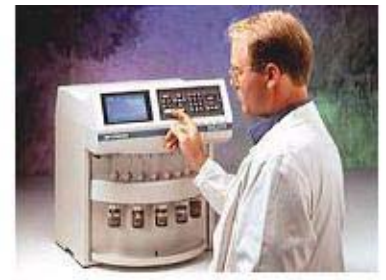
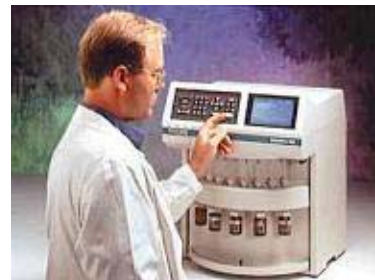
# DNA Core Facility

- Oligonucleotide synthesis
- DNA sequencing service
- Microarray service
- High throughput automation services



# DNA Core Facility

- Oligonucleotide synthesis
- DNA sequencing service
- Microarray service
- High throughput automation services



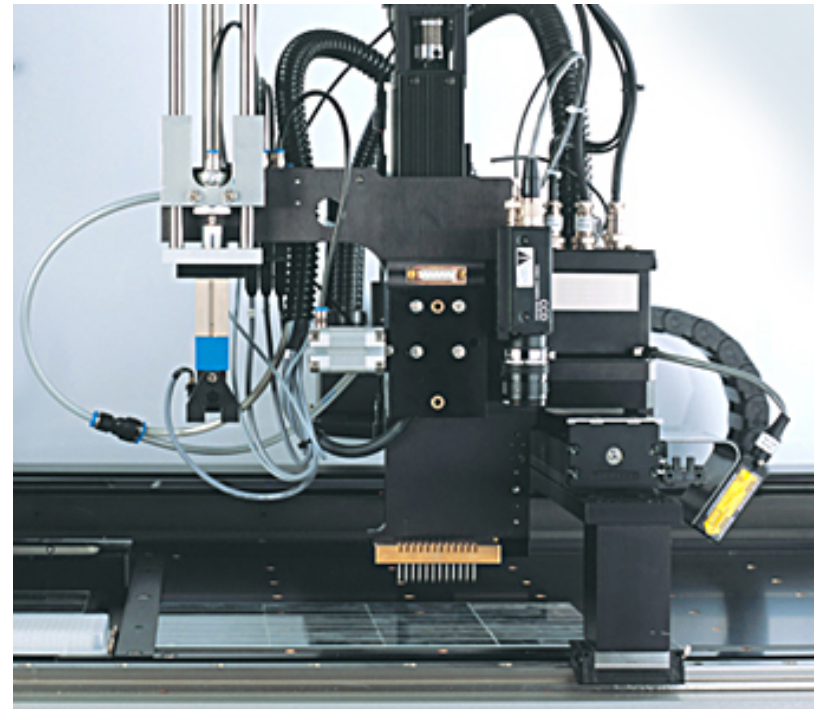
# DNA Core Facility

- Oligonucleotide synthesis
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# DNA Core Facility

- Oligonucleotide synthesis
- DNA sequencing service
- **Microarray service**
- High throughput automation services

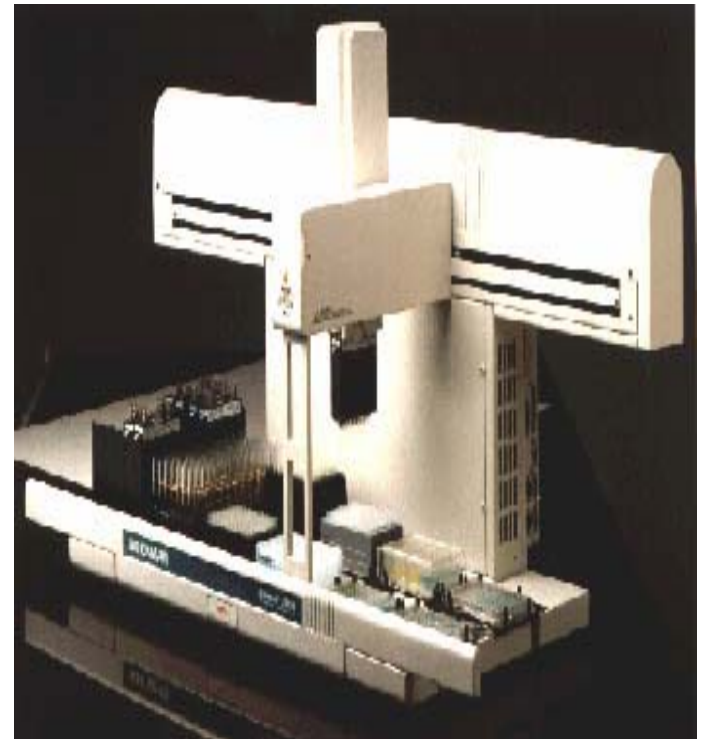


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# DNA Core Facility

- Oligonucleotide synthesis
- DNA sequencing service
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- High throughput automation services

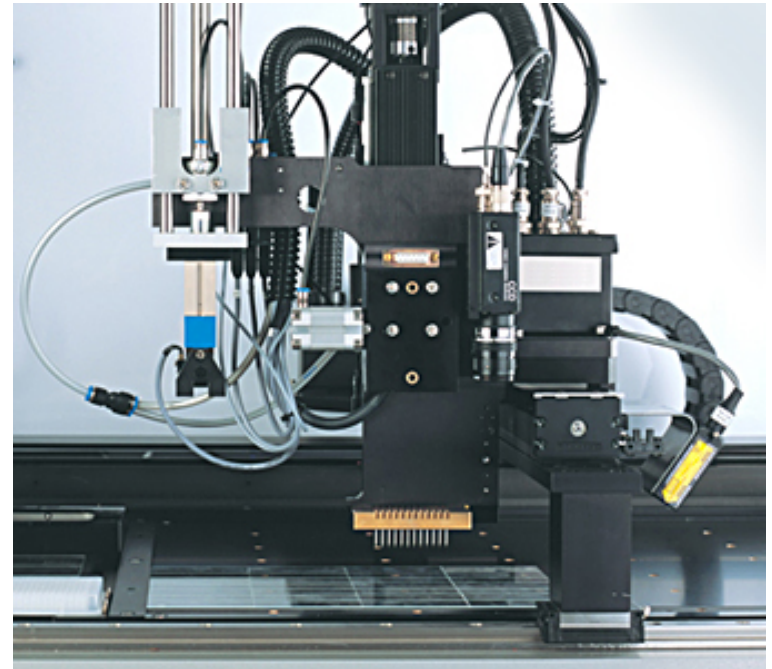


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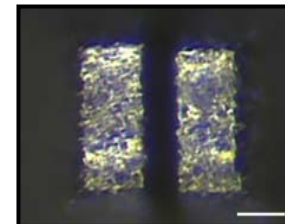
# Microarray Resources

- Bio-Rad ChipWriter



# Microarray Resources

- Bio-Rad ChipWriter
- Telechem Stealth pins



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# Microarray Resources

- Bio-Rad ChipWriter
- Telechem Stealth pins
- Bio-Rad ChipReader





## Microarrays at NML

18 project

- 6 cDNA arrays
- 11 oligo arrays

## Printed in last year

- 75 print runs
- 1900 slides printed



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# Microarray Services

- Array pre-processing
- Chip Design/Printing Considerations
  - Number of genes
  - Number and placement of controls
  - Number of pins
  - Print buffer
  - Duplicates
- Protocol Development
- Management of clone lists





# Clone Lists

Projects Plates **Printables** Templates Layouts PrintRuns

plate	type	pattern	plate 1	plate 2	plate 3	plate 4	printable
<input checked="" type="radio"/> tbPRN0001	16x24	12TIPB	tbDNA0001_00	tbDNA0002_00	tbDNA0003_00	tbDNA0004_00	<input type="radio"/>
<input type="radio"/> tbPRN0002	16x24	12TIPB	tbDNA0005_00	tbDNA0006_00	tbDNA0007_00	tbDNA0008_00	<input type="radio"/>
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plate	pattern	plate 1	plate 2	plate 3	plate 4
tbPRN0001	12TIPB	tbDNA0001_00	tbDNA0002_00	tbDNA0003_00	tbDNA0004_00

printable

create update delete

view plate content

plate 1	plate 2	plate 3	plate 4
tbDNA0001_00	tbDNA0001_00	tbDNA0001_00	tbDNA0001_00
tbDNA0002_00	tbDNA0002_00	tbDNA0002_00	tbDNA0002_00
tbDNA0003_00	tbDNA0003_00	tbDNA0003_00	tbDNA0003_00
tbDNA0004_00	tbDNA0004_00	tbDNA0004_00	tbDNA0004_00
tbDNA0005_00	tbDNA0005_00	tbDNA0005_00	tbDNA0005_00
tbDNA0006_00	tbDNA0006_00	tbDNA0006_00	tbDNA0006_00
tbDNA0007_00	tbDNA0007_00	tbDNA0007_00	tbDNA0007_00



# Chip Template



<b>Template:</b> Bacillus	<b>prg file:</b> Bacillus.prg (sddc-2)	
<b>Printing parameters:</b> <span style="float: right;">View array</span>		
Source plate type	16x24	
Number of pins	X: 4 Y: 4	
Duplicate spots	X: 1 Y: 1	
Subarray size	X: 20 Y: 20	
Movement on plate	TOP-DOWN LEFT-RIGHT	
Movement on slide	DOWN-TOP LEFT-RIGHT	
Plate orientation		
Slide orientation		
<b>Layouts:</b>		
layout	subarrays	plates
Test print layout 1.0	4 x 4	16 / 17





# Chip Layout

<b>Layout:</b> HSV2 Layout 1	<b>Template:</b> HSV1 Oligos	<input type="button" value="view"/>	<input type="button" value="search"/>	<input type="button" value="export"/>
<b>Note:</b>  Program file identical for HSV1 and HSV2 Layouts.  First plate HSV2 Second plate Lucidea Scorecard (Joanne Hiebert version)				
<b>Printable plate assignment:</b>				<input type="button" value="edit"/>
1 MBDNA0350_00		2 MBDNA0314_00		
<b>Static keys:</b>				<input type="button" value="edit"/>
description		creation date	size	
HSV2 Layout 1.0 Gene list		02-DEC-2003	16196	
<b>Printruns</b>				
name		nslide		
HSV2 Print 1.1		16		
HSV-2 Print 1.2		28		

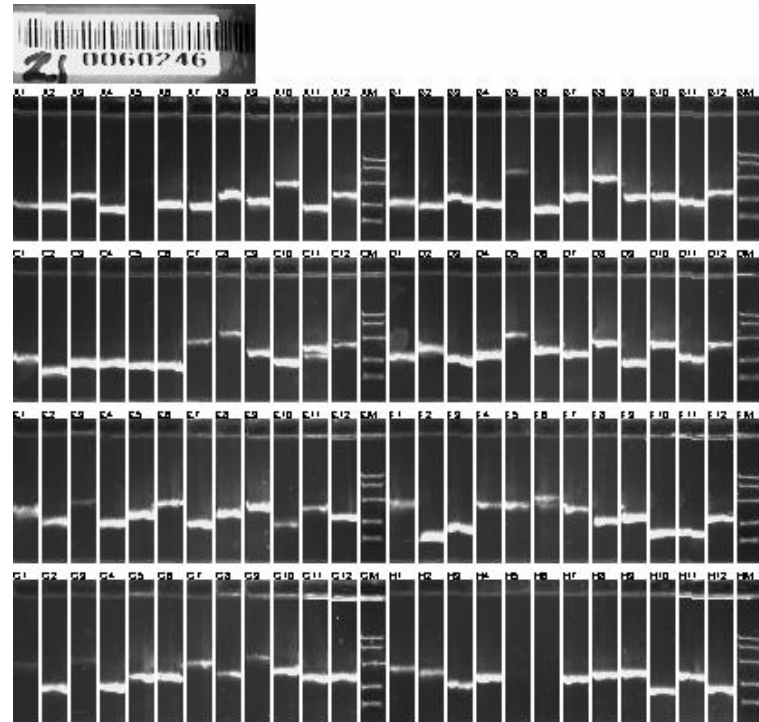






# Microarray QC

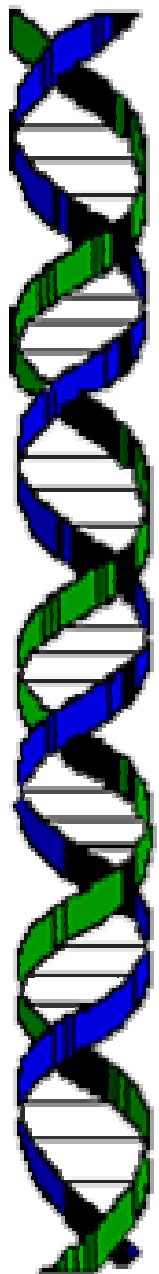
- E-gel of clones





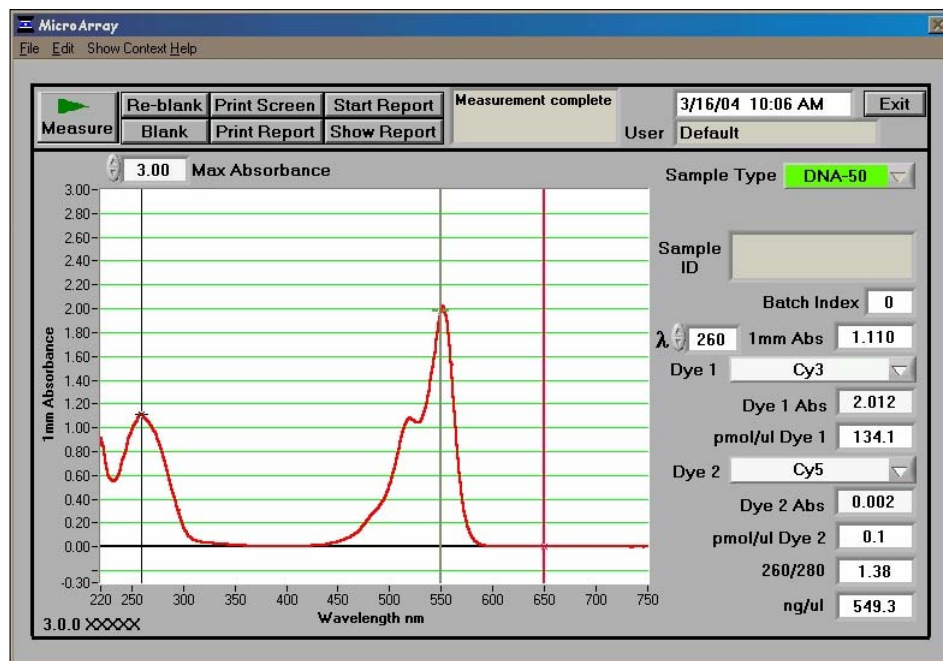
# Microarray QC

- E-gel of clones
- Pre-print of print buffer



# Microarray QC

- E-gel of clones
- Pre-print run of print buffer
- Scanning spec



Sample spectrum reading of Cy3™ labeled product ready for hybridization



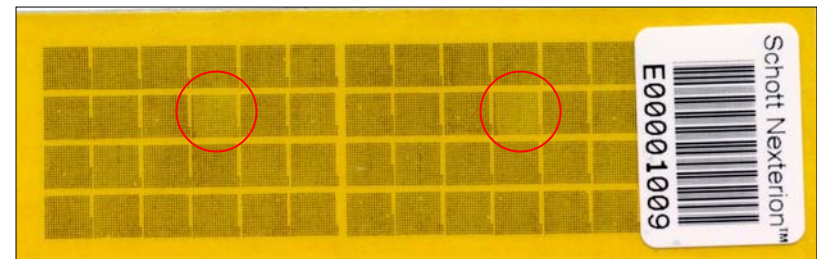
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# Microarray QC

- E-gel of clones
- Pre-print of print buffer
- Scanning spec
- VisArray



VisArray slide of MWG Biotech E. coli array  
Printed in 50% DMSO with 24 pins



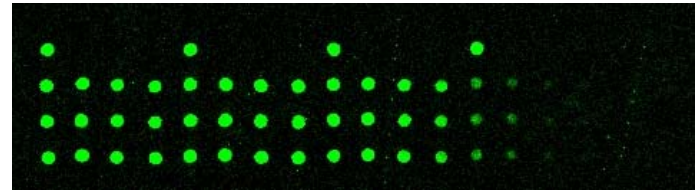
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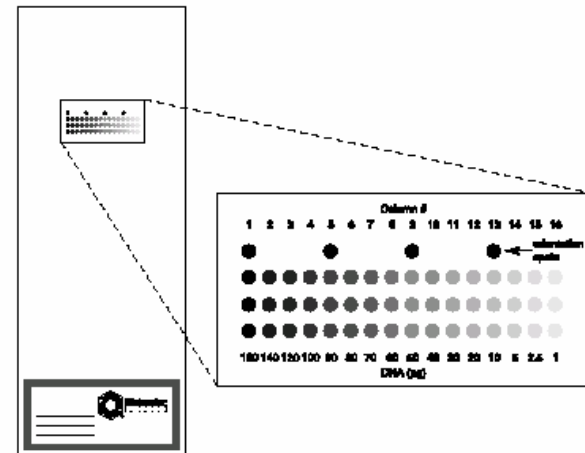


# Microarray QC

- E-gel of clones
- Pre-print of print buffer
- Scanning Spec
- VisArray
- PARAGON™ DNA Microarray QC Stain

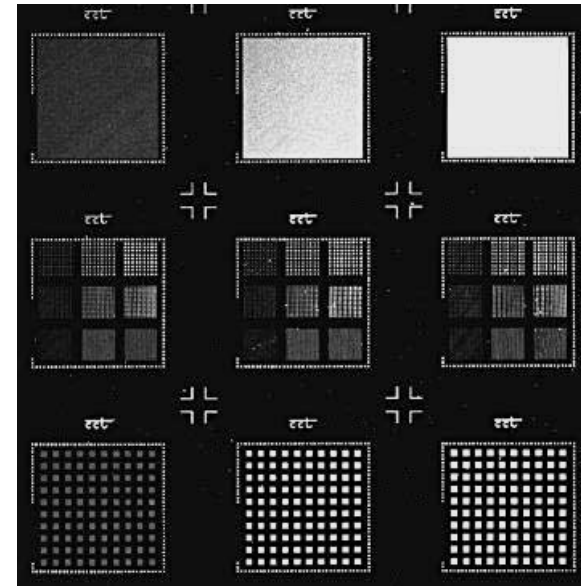


Stained PARAGON Control slide

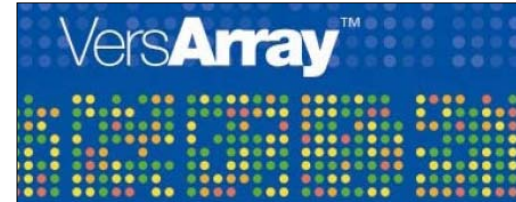


# Microarray QC

- E-gel of clones
- Pre-print run of print buffer
- Scanning spec
- VisArray
- PARAGON™ DNA Microarray QC Stain
- FluorIS slide



# Software Training



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# Further Acquisitions

- High throughput scanner
- Automated Hybridization machine
- Agilent Bioanalyzer
- High throughput automated workstation



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# Acknowledgements

- Dr. Morag Graham, Director, Genomic Services
- Shaun Tyler, Head, DNA Core Facility
- Shari Tyson, Automation and Robotics Technician



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