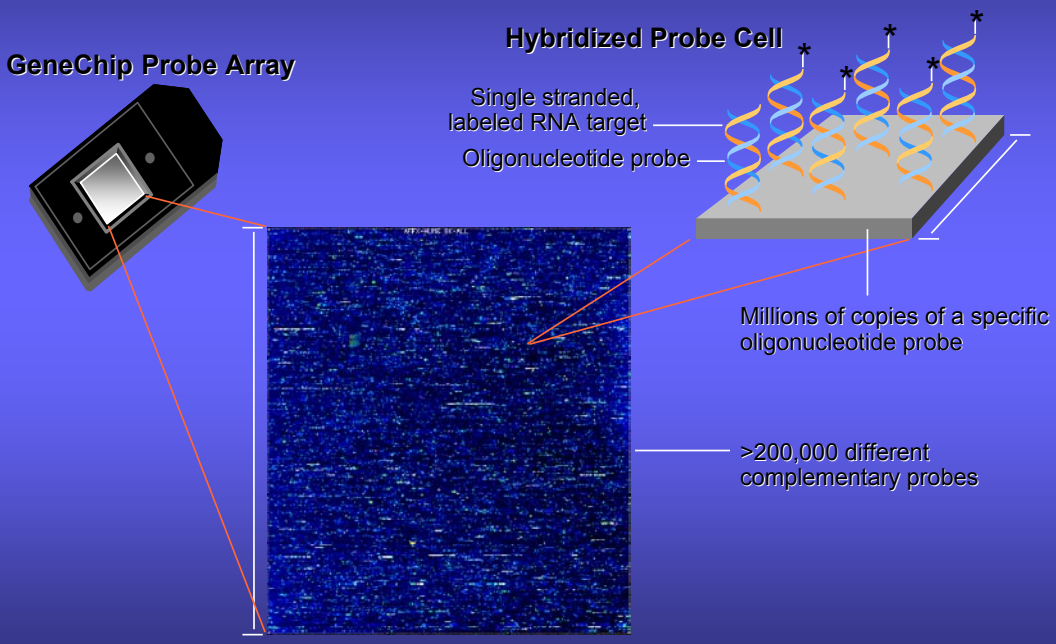
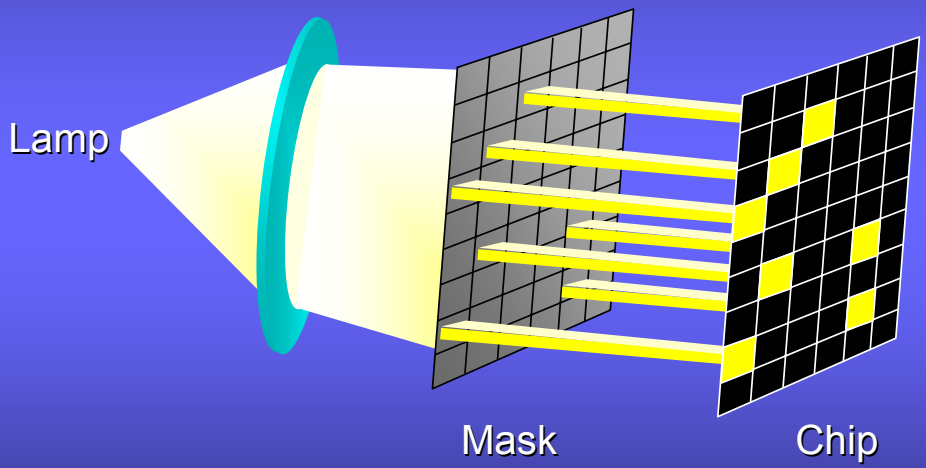
GeneChip® Probe Arrays



Damla D. Bilgin
Univ. of Illinois, Urbana

Courtesy of: Mike Lelivelt

Photolithographic Synthesis



Damla D. Bilgin
Univ. of Illinois, Urbana

Courtesy of: Mike Lelivelt

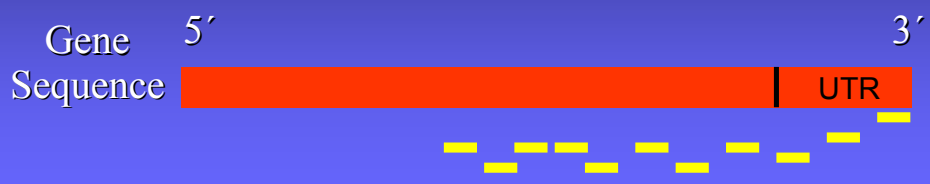
Affymetrix Soybean Genome Array

The GeneChip® Soybean Genome Array can be used to study gene expression of over 37,500 soybean *(Glycine max)* transcripts.

The array includes probe sets to detect approximately 15,800 transcripts for *Phytophthora sojae* as well as 7,500 *Heterodera glycines* (cyst nematode pathogen) transcripts.

Damla D. Bilgin
Univ. of Illinois, Urbana

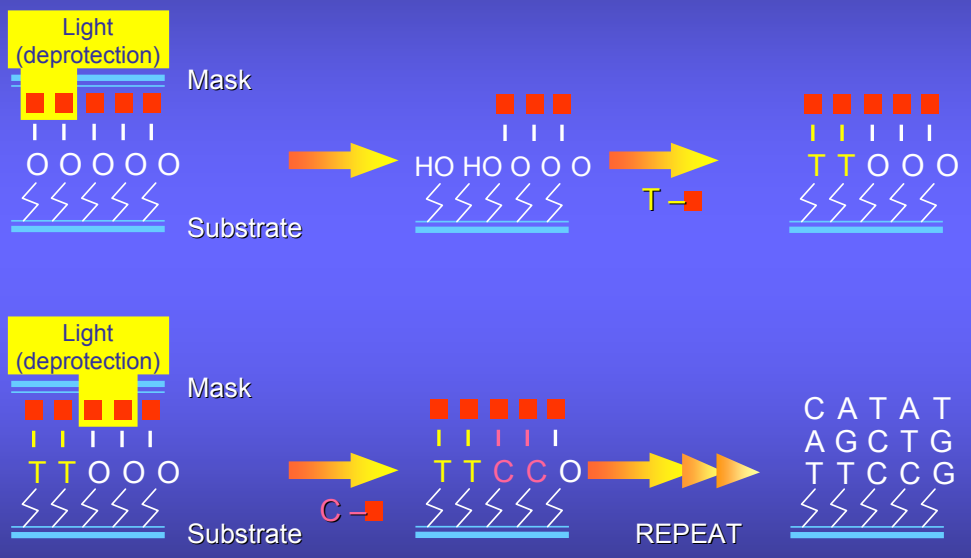
GeneChip® Expression Array Design



3' biased multiple oligo probes

Damla D. Bilgin
Univ. of Illinois, Urbana

Synthesis of Ordered Oligonucleotide Arrays



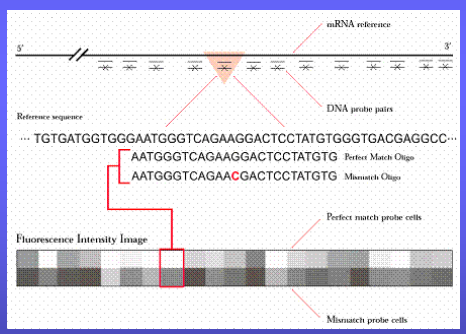
Damla D. Bilgin
Univ. of Illinois, Urbana

Courtesy of: Mike Lelivelt

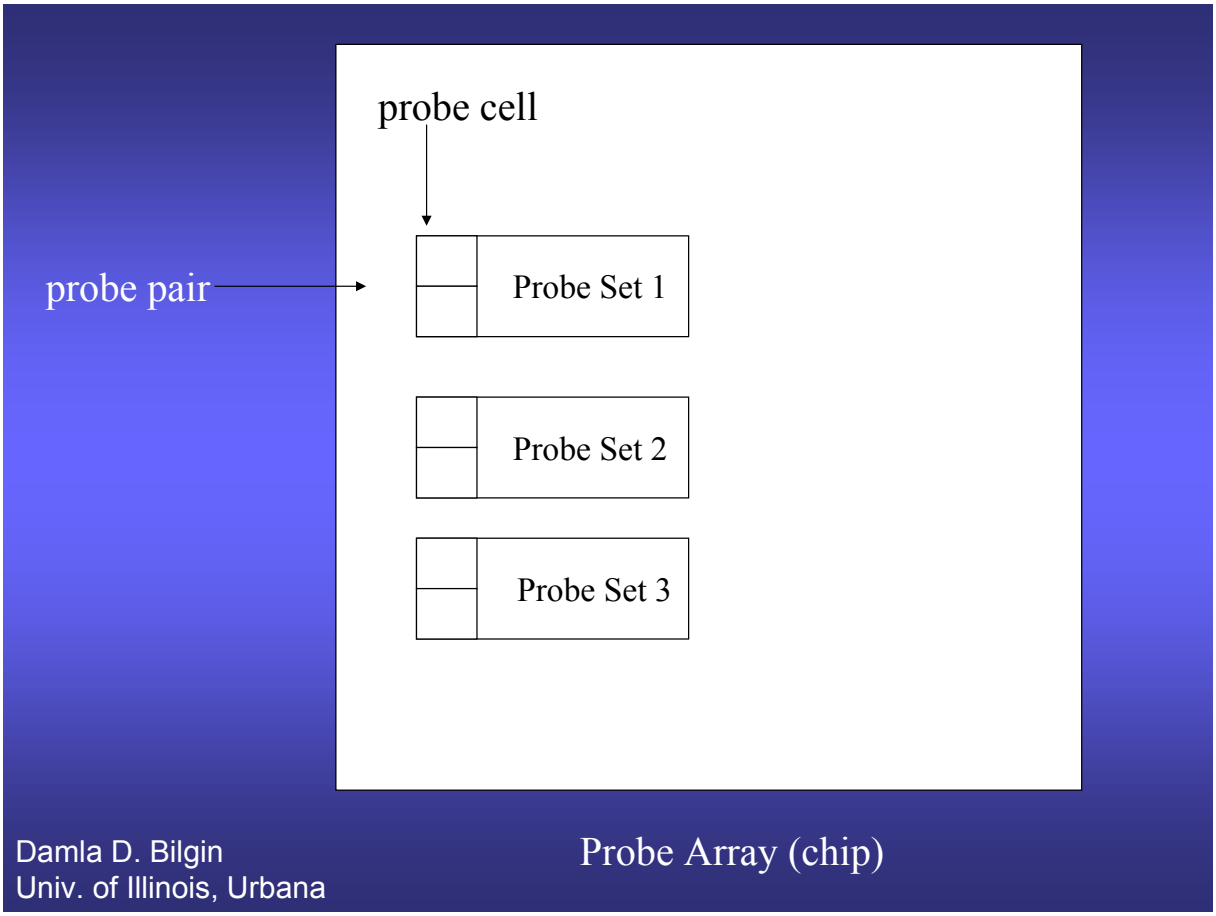
GeneChip Probes (Affymetrix)

- **25-mer oligonucleotides synthesized directly on the glass**
- **11-20 probe pairs are selected among all possible 25-mers to represent each transcript**
- **Perfect Match/Mismatch probe pair strategy**

Figure 3: Oligonucleotide Probe Pair



Damla D. Bilgin
Univ. of Illinois, Urbana

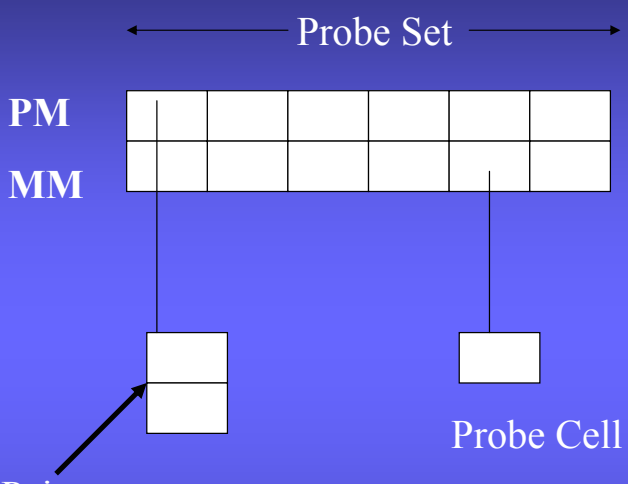


Damla D. Bilgin
Univ. of Illinois, Urbana

Probe – a single-stranded DNA oligonucleotide complementary to a specific sequence. Each probe cell consists of millions of the same probe molecules.

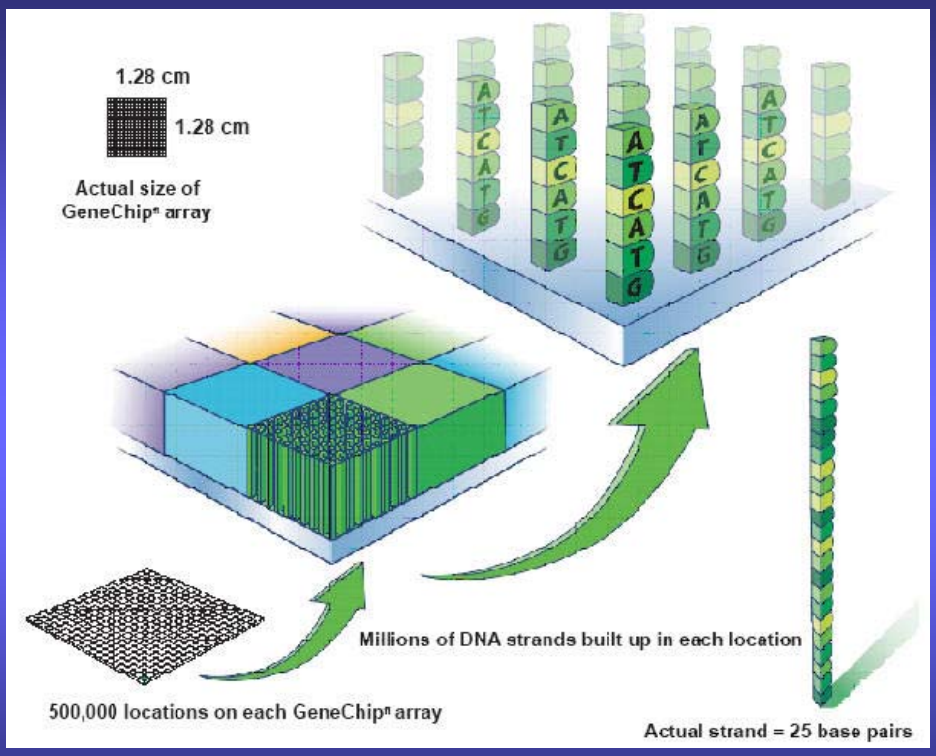
The intensity of each cell is an average of each of its scanned pixels.

Damla D. Bilgin
Univ. of Illinois, Urbana



Each pair represents a different *subsequence* of the gene

Damla D. Bilgin
Univ. of Illinois, Urbana



Damla D. Bilgin
Univ. of Illinois, Urbana

Definitions

Probe – a single-stranded DNA oligonucleotide complementary to a specific sequence. Each probe cell consists of millions of probe molecules.

Probe Array – a collection of probes sets.

Probe Set – a set of probes designed to detect one transcript. 16-20 probe pairs. A 20 probe pair set is made up of 20 PM and 20 MM for a total of 40 probe cells.

Probe Pair – Two probe cells, a PM and its corresponding MM.

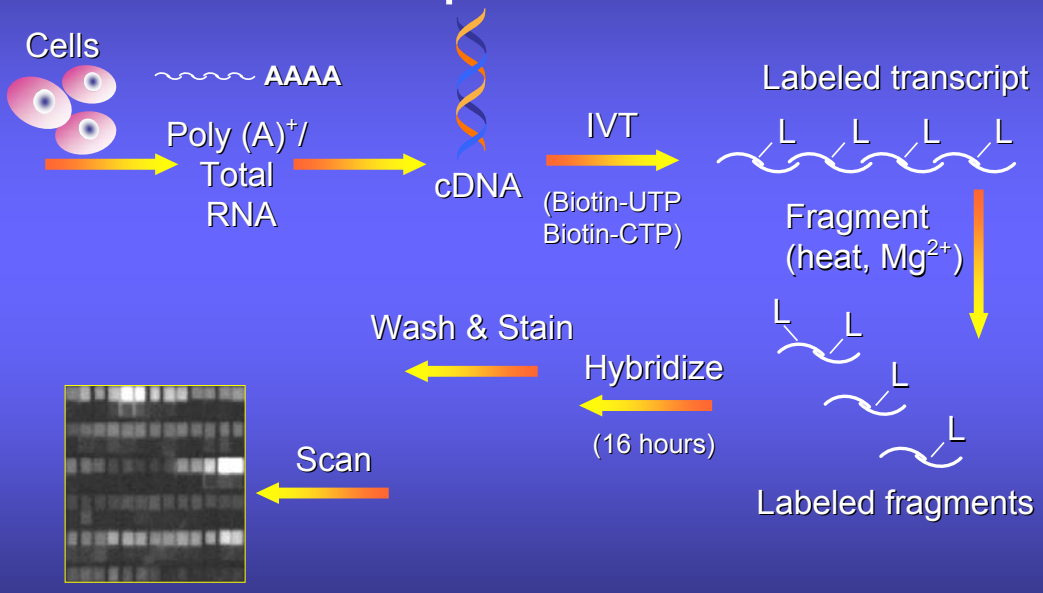
Perfect Match (PM) – probes that are designed to be complementary to the reference sequence.

MisMatch (MM) – probes that are designed to be complementary to the reference sequence except for 1 base.

Target – sequence from your sample.

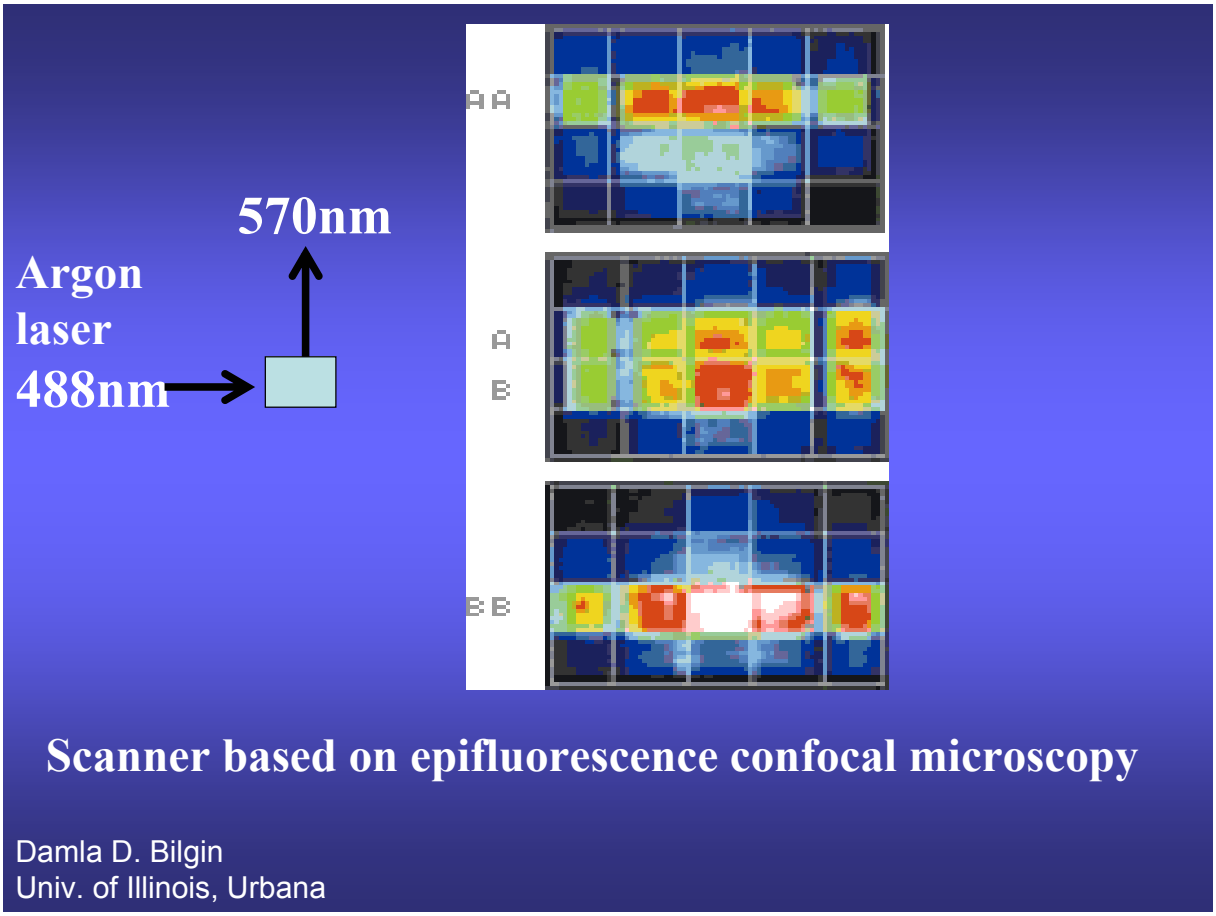
Damla D. Bilgin
Univ. of Illinois, Urbana

Procedures for Target Preparation



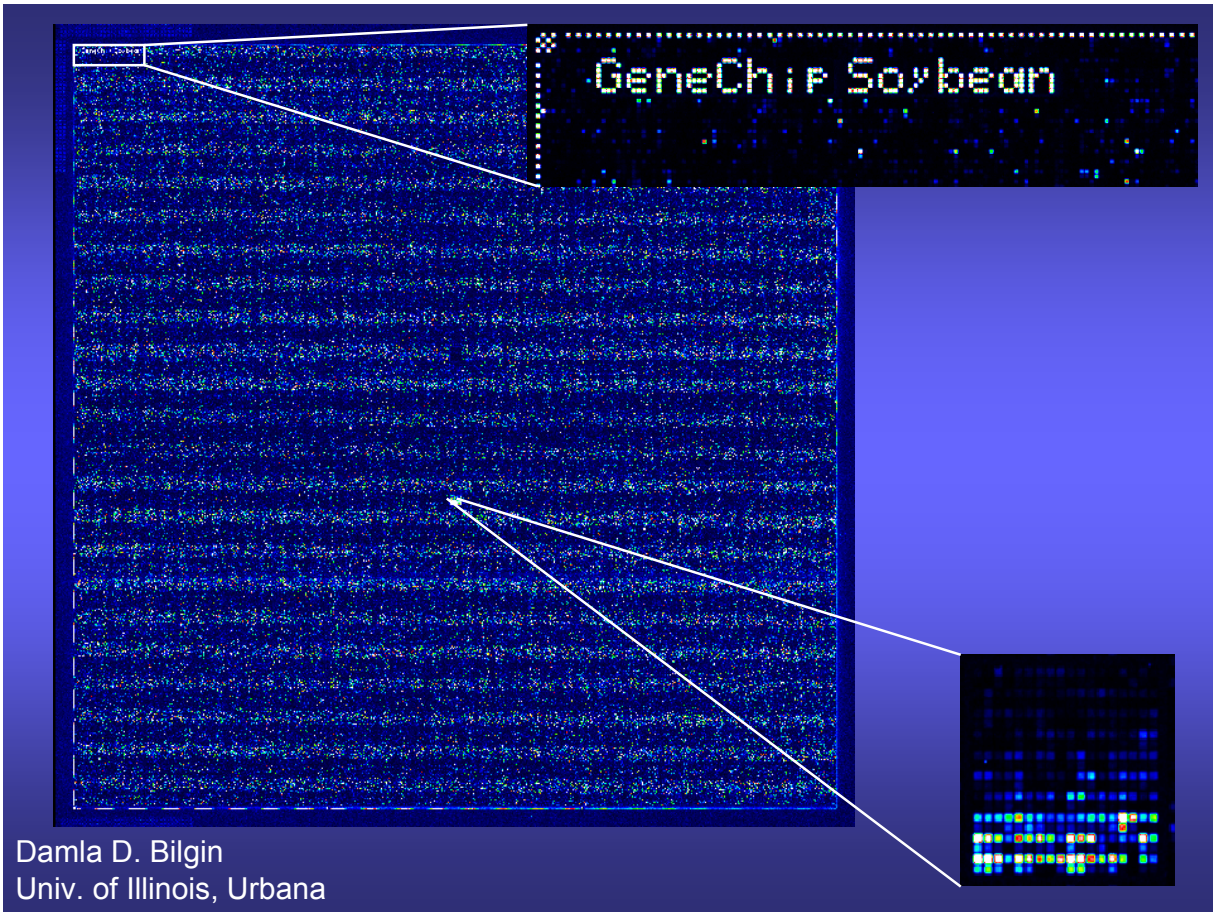
Damla D. Bilgin
Univ. of Illinois, Urbana

Courtesy of: Mike Lelivelt



Scanner based on epifluorescence confocal microscopy

Damla D. Bilgin
Univ. of Illinois, Urbana

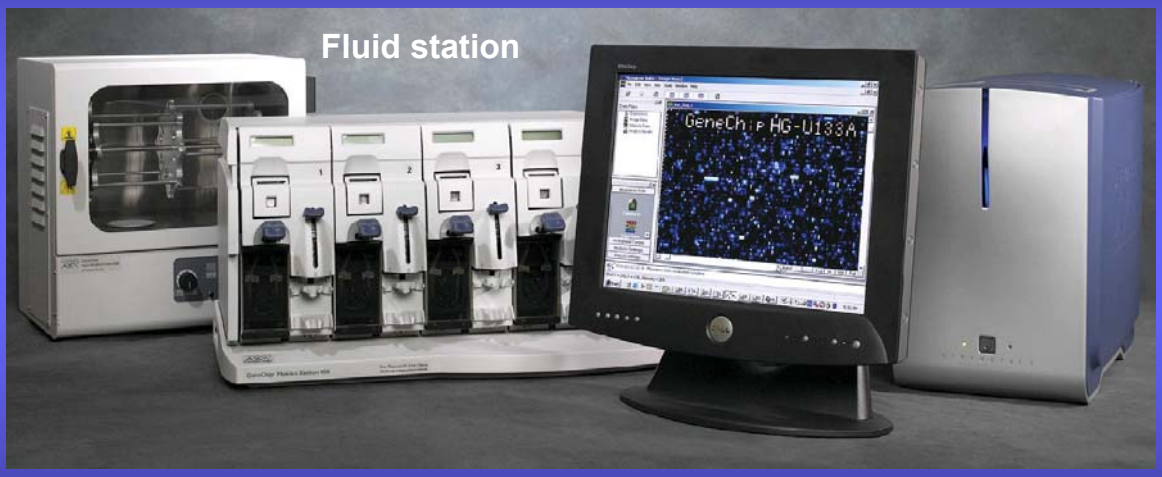


Damla D. Bilgin
Univ. of Illinois, Urbana

Affymetrix Core Facility at W.M. Keck Center at Univ. of Illinois at Urbana-Champaign

Hybridization oven

Scanner



Damla D. Bilgin
Univ. of Illinois, Urbana

Useful web sites

http://www.affymetrix.com/products/arrays/index.affx

http://www.biotech.uiuc.edu/centers/Keck/Functional_genomics/

http://www.iobion.com/support/support_GT_training.html

http://www.cropsci.uiuc.edu/faculty/clough/

Damla D. Bilgin
Univ. of Illinois, Urbana