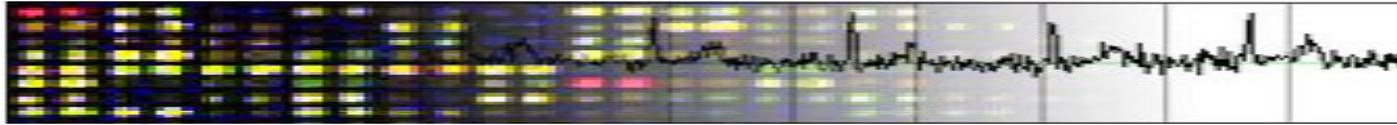


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2.771J BEH.453J HST.958J Spring 2005

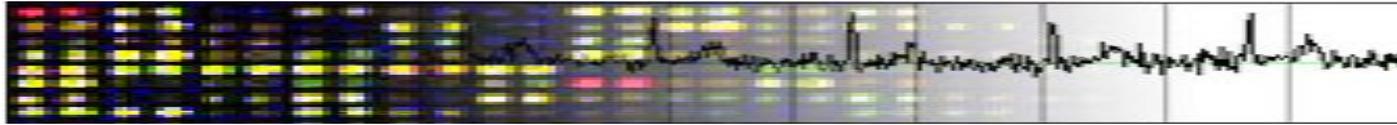
Lecture 29 March 2005

Microarray Information I



Microarray Information I

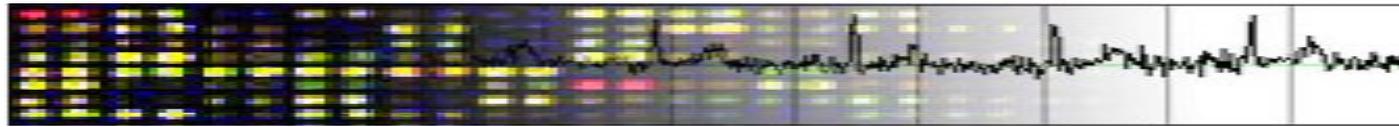
- *Physical description of array experiments*
- *Raw data and analyzed data*
- *Existing database schema*
- *Standardization*
- *Analysis of raw data*



Physical description of microarrays, raw data, and uses

Here is a typical scenario from Monsanto (circulated). Monsanto is applying microarray assays to determining genetic modifications on crops.

Author: Harry Harlow, 2002



Microarray ontology and schema efforts

Microarray Gene Expression Data Society ([MGED](#))

MicroArray Gene Expression Markup Lang. ([MAGE-ML](#))

MicroArray Gene Expression Object Model ([MAGE-OM](#))

Minimum Information About a Microarray Experiment
([MIAME](#))

MIAMExpress and Array Express

Ref: Stockert et al., Nature Genetics Suppl. 32: 469-473 (2002)

BASE

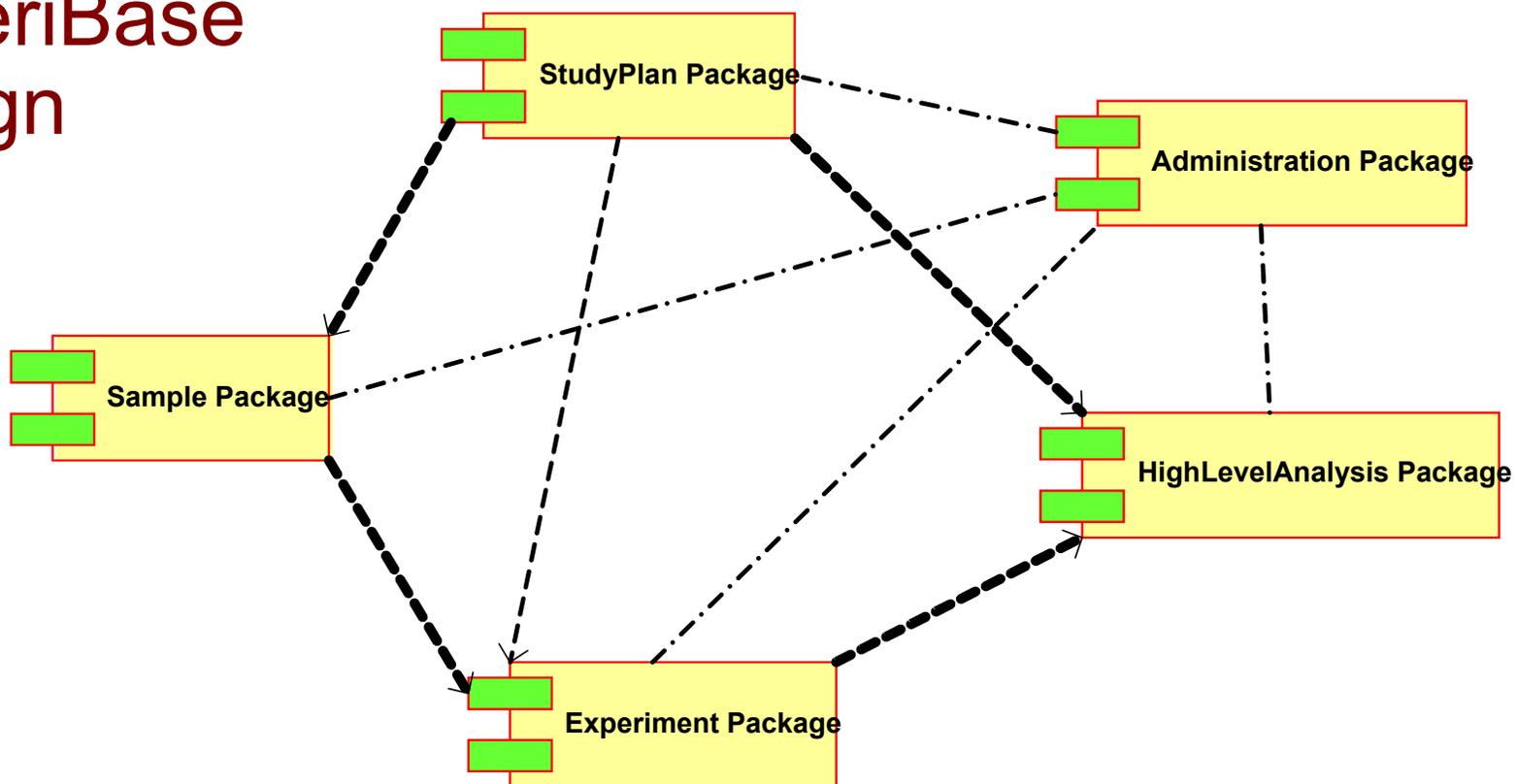
**Image removed for
copyright reasons.**

**The BioArray
Software
Environment
v1.2**

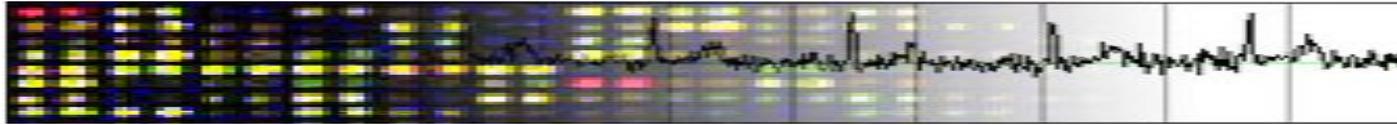
<http://base.thep.lu.se>



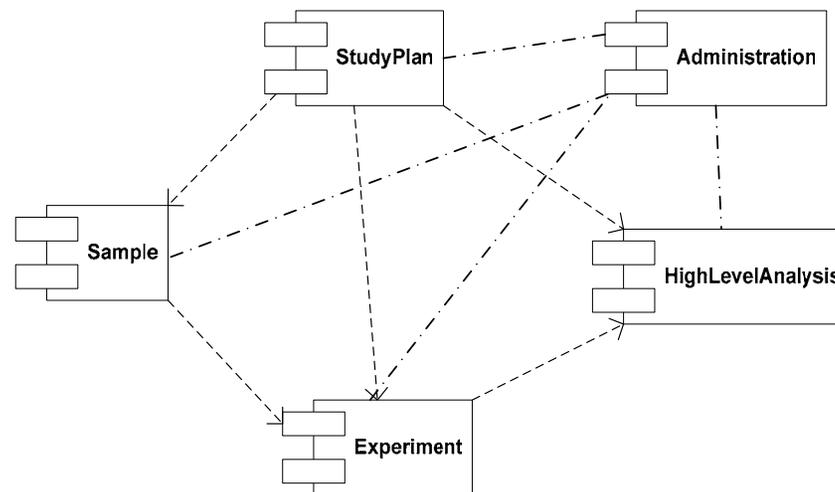
ExperiBase design



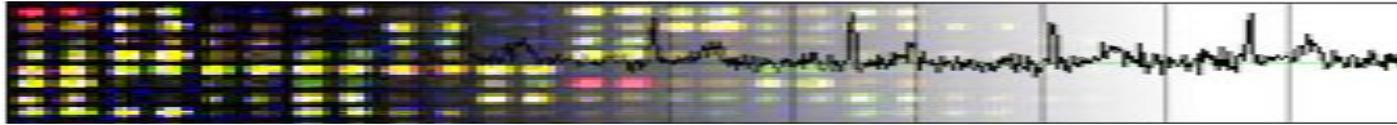
A->B: Dependency. The changes of A can cause changes in B.
-.-: Reference



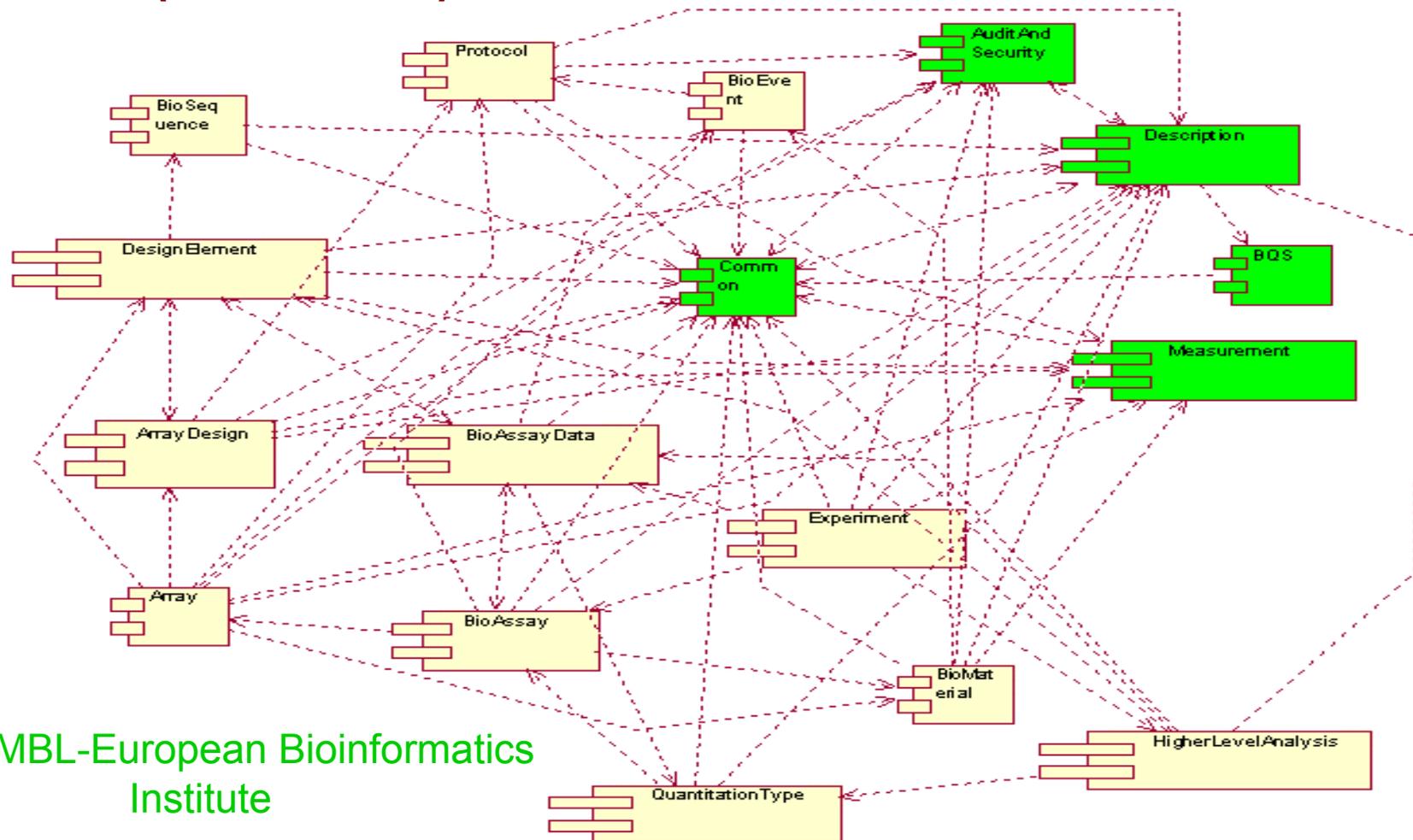
ExperiBase design for single experiment



A->B: Dependency. The changes of A can cause changes in B.
-.-: Reference

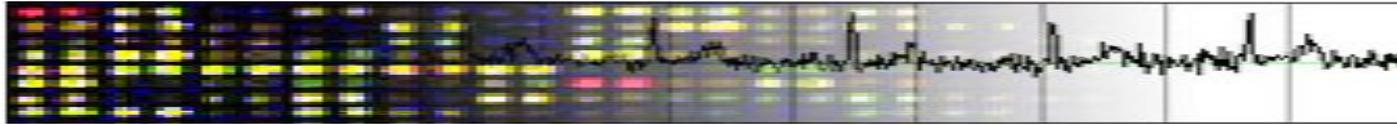


MicroArray and GeneExpression Object Model (MAGE-OM)

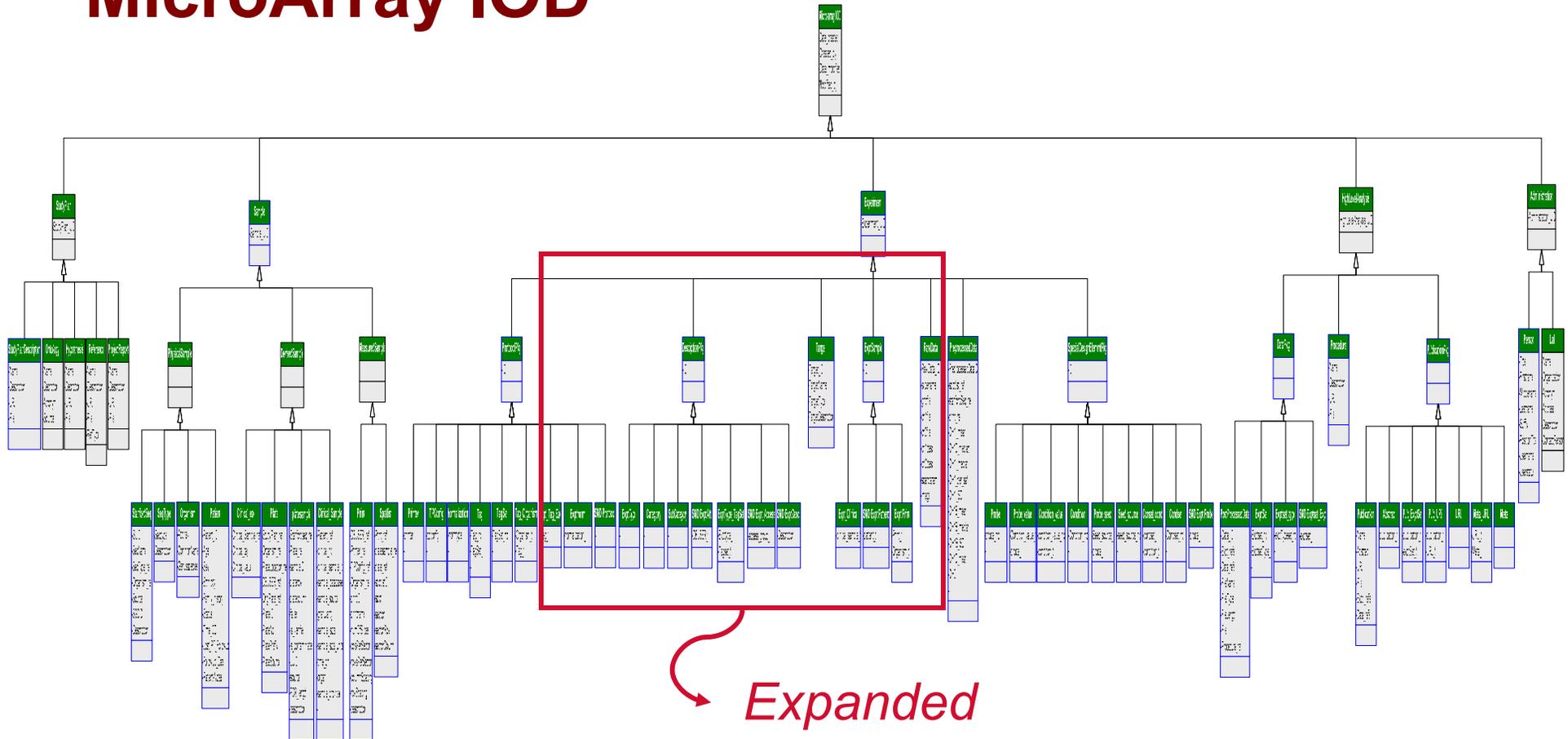


Map MAGE Objects onto ExperiBase nomenclature

StudyPlan		
Sample	Physical Sample	Biomaterial
	Derived Sample	Array
	Measured Sample	BioAssay
Experiment	Protocol	Protocol, AssayDesign, Measurement
	Sample Treatment	Bioevent
	Target	BioAssaySequence
	Description	Experiment, Description, QuantitationType, DesignElement
	Raw Data	RawBioAssayData
	Pre-Processed Data	BioAssayData
HighLevelAnalysis		HighLevelAnalysis, BioSequence
Administration	Personnel	Contact
	Audit and Security	Audit and Security

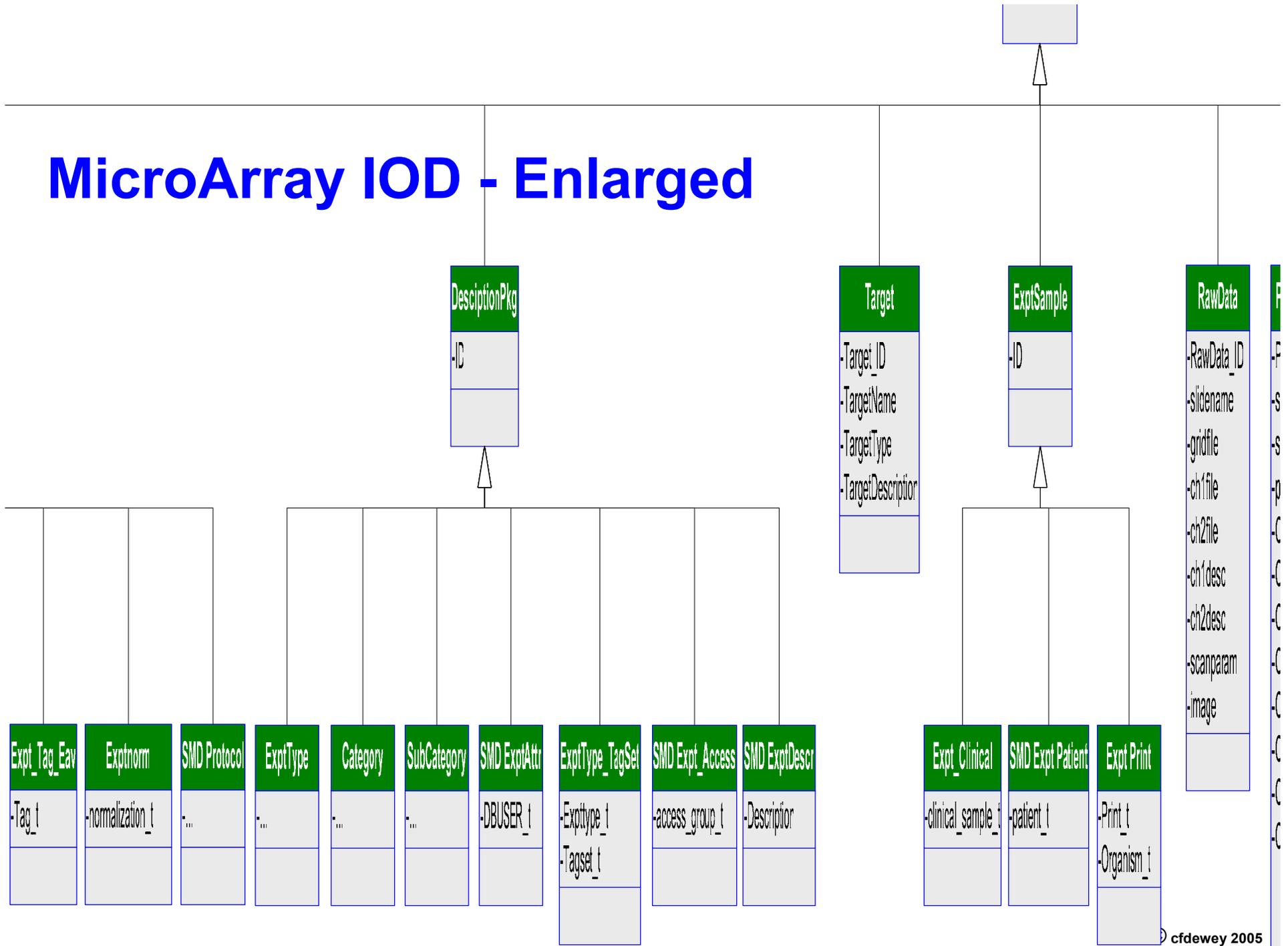


MicroArray IOD

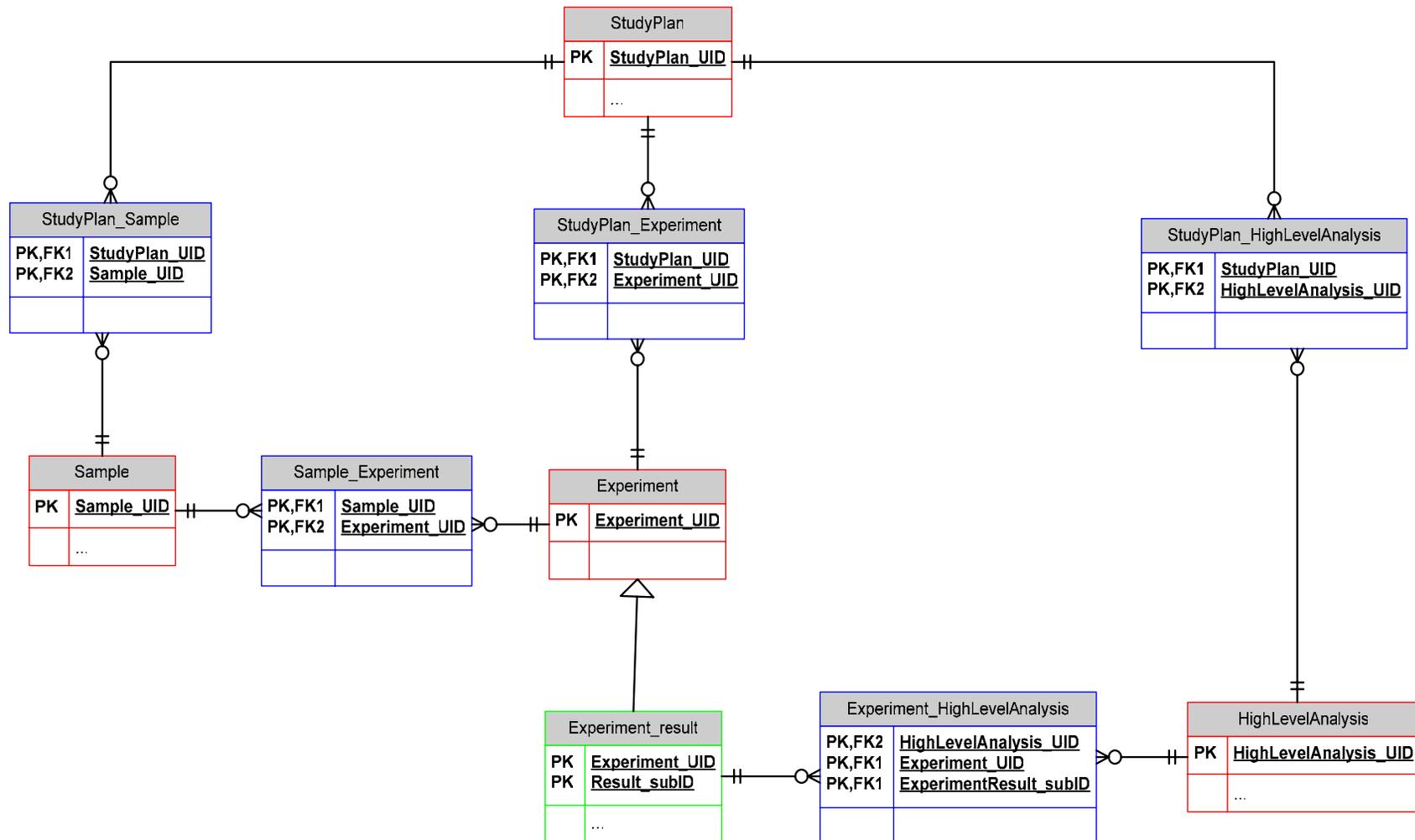


--Based on Stanford Microarray Database

MicroArray IOD - Enlarged

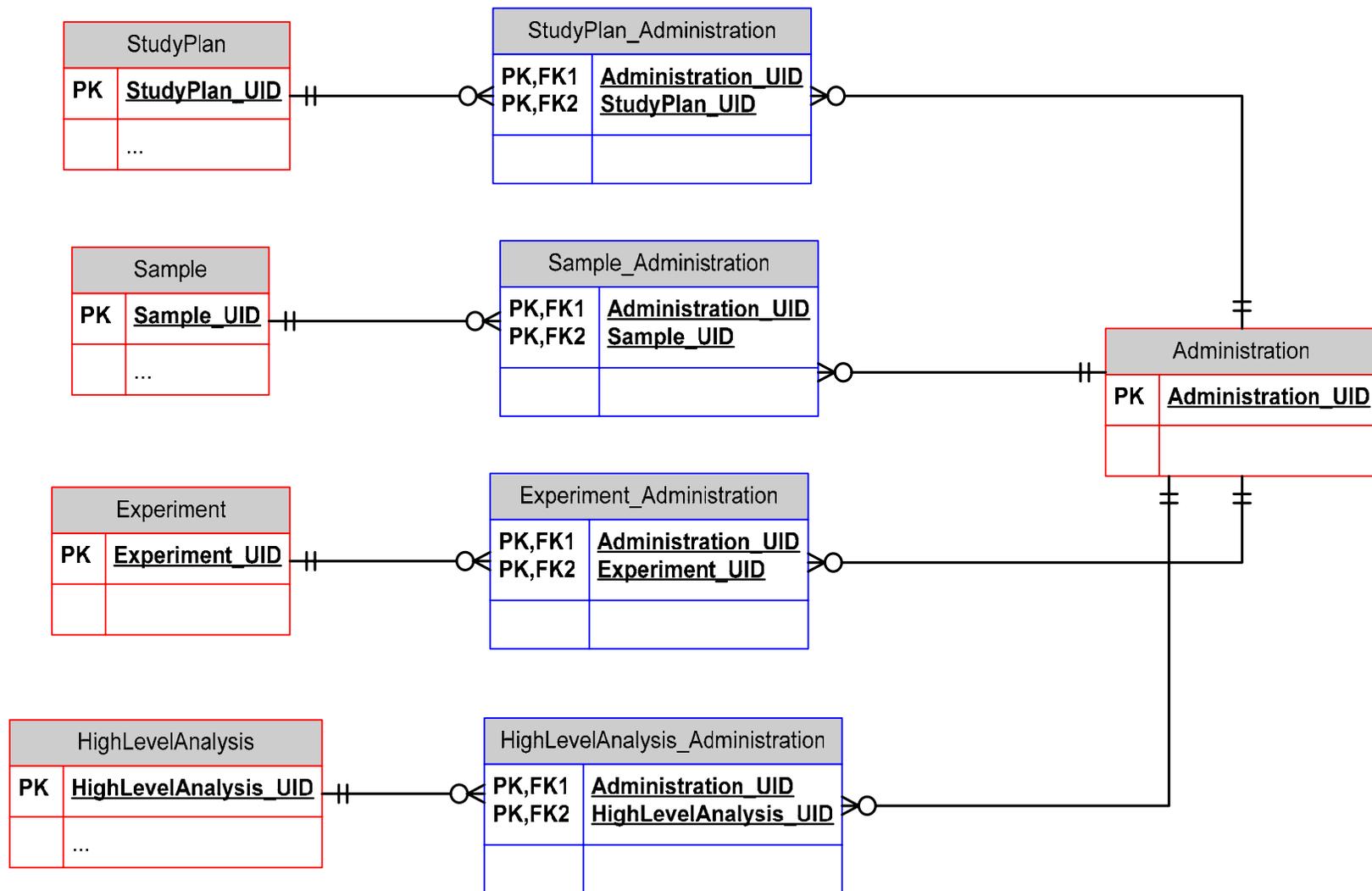


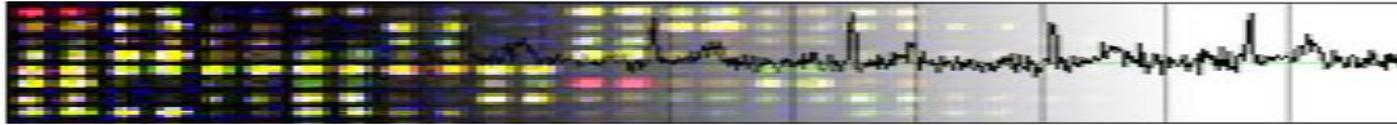
Main Relationships



Red color: represents that the box is the main entity of a package.
 Green color: represents that the box is a child entity of a package.
 Blue color: represents that the box is an intermediate entity between two packages.

Main Relationships (cont.)





Database Features

- Extensible

Allow the users to create their own protocol/table; XML/SOAP

- Flexible

Suitable for a variety of biological experiment methods;

- Functional

Store any kinds of experimental data:

Image, video, graph, data sheet, text file, etc.

Sample description, treatment, raw & processed data

Manage Data.

- Convenient

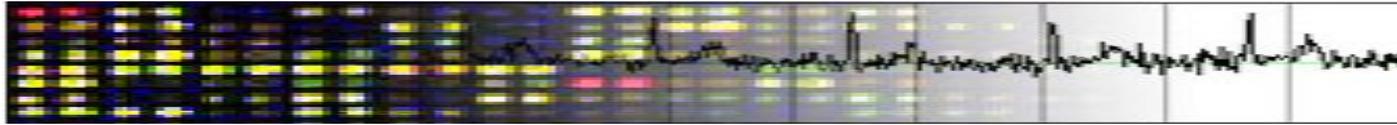
WWW accessible friendly user interface with security design:

Viewer, experimenter, administrator

<http://schiele.mit.edu:8080/research/index.htm>

Raw data from microarray

**Image removed for copyright reasons.
Figure 1 from Sherlock et al., Nucl. Acids Res. 2001: 29 45-48.**



Analyzing spot data from array

See the typical spot analysis from Stanford (Sherlock et al., Nucl. Acid Res. 29: 152-155) that was circulated.