

## Announcements

- Change in Monday office hours:  
**5pm – 6:15pm: Doherty Hall 2313**
- Literature assignment 1 on class website  
(02-711/03-711/18-856 only)

## Literature assignment 1

- *Next-generation genomics: an integrative approach.*  
Hawkins *et al.*, Nat. Rev. Genet. 2010;11:476–86.
- Due September 27<sup>th</sup>, 5pm
  - in class
  - in person to Annette McLeod in MI 646
  - electronically to [comp-bio@cs.cmu.edu](mailto:comp-bio@cs.cmu.edu)
- Read article, briefly answer questions.
- You may read additional materials if you wish. If you do, *you must cite your sources.*

## Why cite?

- Citations reflect *the careful and thorough work you have put in* to locating and exploring your sources.
- Citations *help readers understand the context* of your argument, and locate your work within other conversations on your topic.
- Citations allow you to *acknowledge those authors who made possible particular aspects of your work*. Failure to provide adequate citations constitutes plagiarism.
- Citations, by delineating your intellectual debts, also *draw attention to the originality and legitimacy of your own ideas*.

<http://www.dartmouth.edu/~sources/about/what.html>

## When to cite?

- Cite sources for all verbatim quotations of two or more consecutive words.
- Cite sources from which you paraphrase or summarize facts or ideas.
- Cite sources for ideas or information that could be regarded as common knowledge but which you think your reader might still find unfamiliar.

<http://www.dartmouth.edu/~sources/about/what.html>

## What to cite?

**Primarily:** *refereed, archival* materials. (Archival materials are materials that are available in libraries or bookstores, have an ISBN number, etc.)

- Books
- Journal articles
- Refereed conference proceedings

**Avoid:**

- Websites, news stories, photocopied workshop handouts, personal communications.
- *Wikipedia is not a refereed archival source.*

### The original text:

The main image in *Othello* is that of animals in action, preying upon one another, mischievous, lascivious, cruel or suffering, and through these, the general sense of pain and unpleasantness is much increased and kept constantly before us.

More than half the animal images in the play are Iago's, and all these are contemptuous or repellent: a plague of flies, a quarrelsome dog, the recurrent image of bird-snaring, leading asses by the nose, a spider catching a fly, beating an offenceless dog, wild cats, wolves, goats and monkeys<sup>1</sup>.

1. Caroline F. E. Spurgeon, *Shakespeare's Imagery* (Cambridge: Cambridge UP, 1935) 335.

### Students paper:

The majority of the animal images in the play are Iago's, and all of these are contemptuous or repellent. He refers to a plague of flies, a quarrelsome dog, bird-snaring, leading asses by the nose, a spider catching a fly, beating an offenceless dog, wild cats, goats and monkeys. Through these images the general sense of pain and unpleasantness is increased and kept constantly before us.

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**Students paper:**

I believe that the main image in Shakespeare's tragedy, *Othello*, is that of animals. These creatures are constantly in action, preying upon one another, and they are depicted as mischievous, wanton, cruel or suffering. By Shakespeare's ingenious use of these animal images, the general sense of pain and unpleasantness that pervades the entire story is much increased and kept constantly before the reader.

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**Not OK:**

**Students paper:**

In *Othello*, Shakespeare makes frequent use of animal imagery. The specific images he uses are generally distasteful and convey to the reader a constant impression of conflict and misery.

**The original text:**

The main image in *Othello* is that of animals in action, preying upon one another, mischievous, lascivious, cruel or suffering, and through these, the general sense of pain and unpleasantness is much increased and kept constantly before us.

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**OK:**

**Students paper:**

In the play, *Othello*, the character of Iago is associated with unpleasant animal imagery[1]....

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The majority of "the animal images in the play are Iago's, and all of these are contemptuous or repellent". He refers to "a plague of flies, a quarrelsome dog," "bird-snaring, leading asses by the nose, a spider catching a fly, beating an offenceless dog, wild cats, goats and monkeys." "Through these" images "the general sense of pain and unpleasantness is increased and kept constantly before us." [1]

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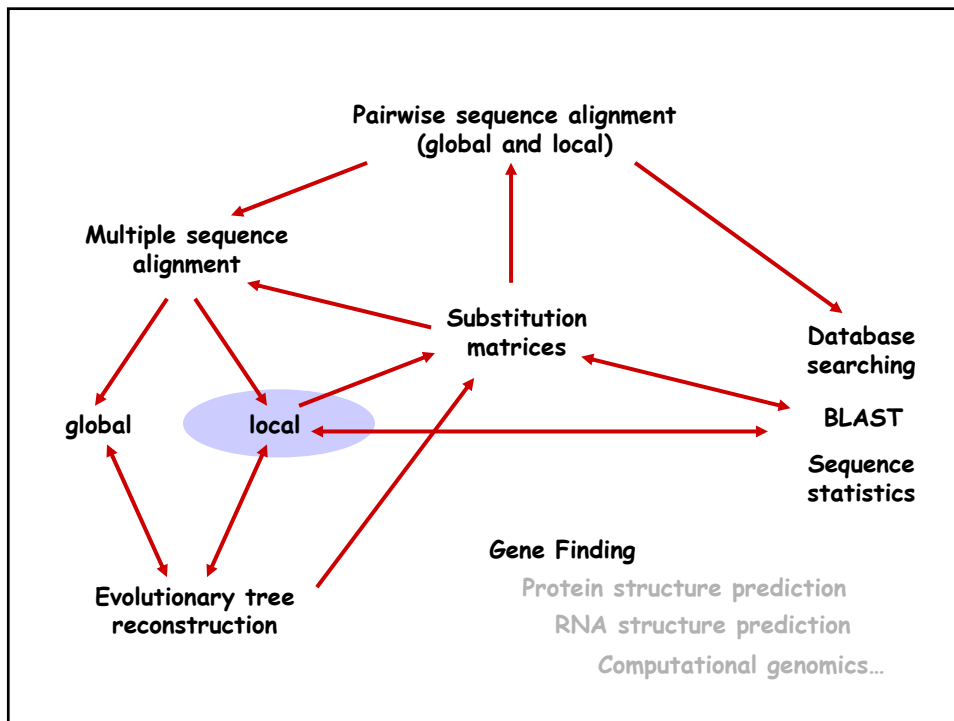
**OK:**

**Students paper:**

Caroline Spurgeon uses the words "contemptuous" and "repellent" in describing the animal imagery associated with Iago in *Othello* [1]. In my opinion, her choice of words indicates that...

1. Caroline F. E. Spurgeon, *Shakespeare's Imagery* (Cambridge: Cambridge UP, 1935) 335.

<http://www.dartmouth.edu/~sources/about/what.html>



# Applications of Local MSA

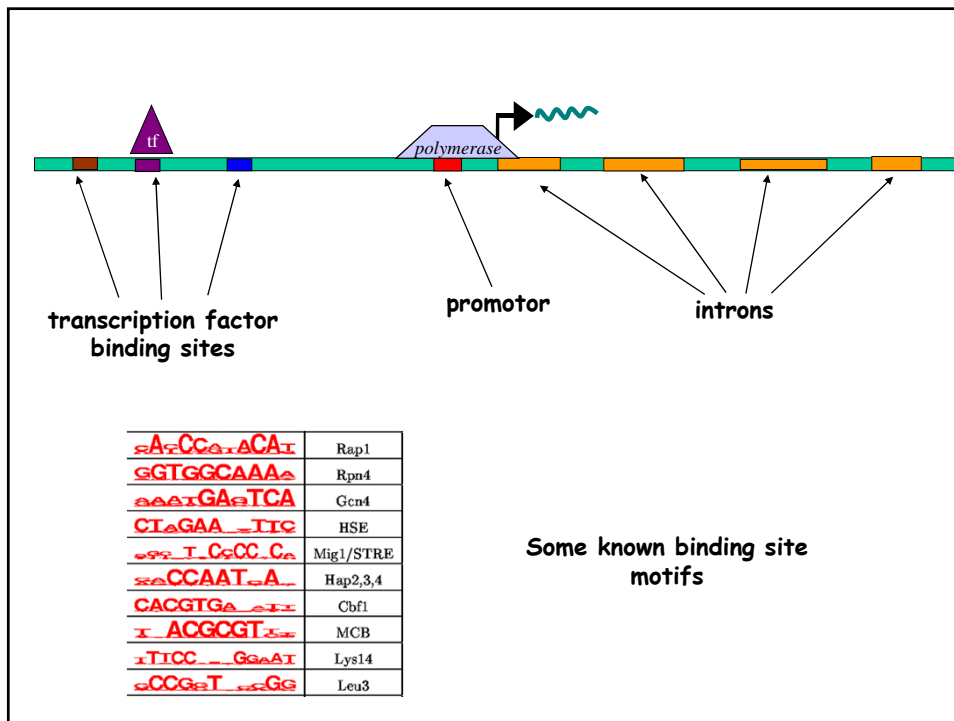
## Conserved patterns in biological sequences

Example: Transcription factor binding sites

```

SP  ...gcttt AATTTTCACTATATACTATAA cgatt...
ST  ...cagat ATAAATGATATAGTGGTTATA gttaa...
ST  ...atcct TTTTATTATTAAATCGTATTA gcagc...
EC  ...aggct ATAAATGATATAGTGGTTATA gttag...
EC  ...acctt TTTTATTATTAAATCGTATTA gtcac...
VC  ...ttata ACTAATAATTATAAAAATATGT gtgtc...
YP  ...gctga TGAAATGATATAATCGTTATA taaga...
    
```

...agcgagcctgagcactcga**ggcat**ctctgcacattcagc**atgggatgggcctcctgtc**ccctgtatgcgcctgatga...





# Applications of Local MSA

## Conserved patterns in biological sequences

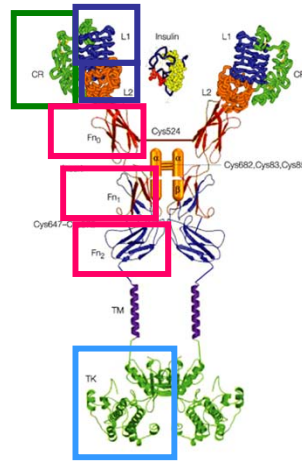
Example: Protein domains

Fold independently

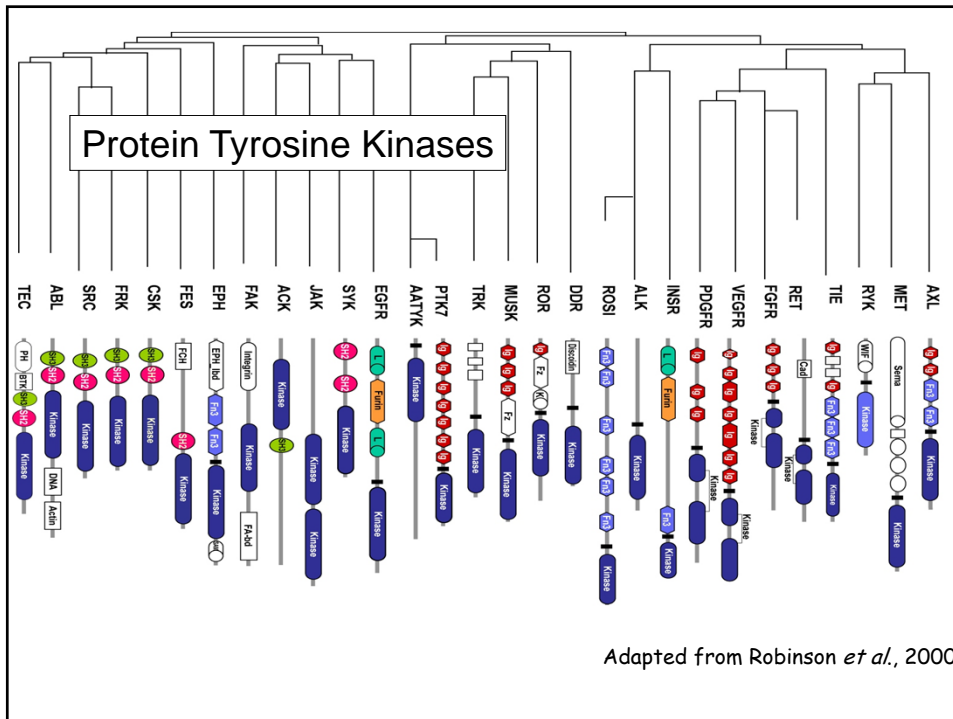
Carry out specific functions

Found in diverse contexts

Conserved in evolution



Insulin receptor



# Protein domain databases

## Conserved Domain Database (CDD)

Representation: Position specific scoring matrices (PSSMs)

Structurally corrected local MSAs

CDART: Conserved Domain Architecture Retrieval Tool

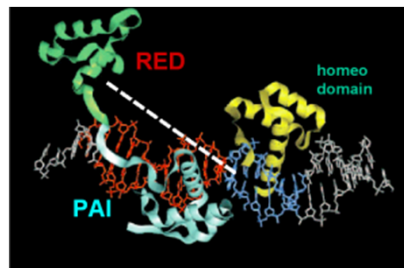
## PFAM, SMART

Representation: Hidden Markov Models (HMM's)

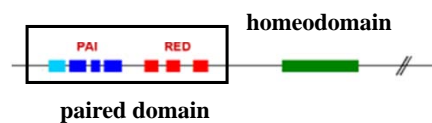
Curated local MSA's

## More:

see Mount, Table 9.5



Pax structure



Pax domain architecture

<http://www.gene-regulation.com/info/pax.html>

## Multi-domain protein example: PAX gene family

- Developmental regulatory genes that encode transcription factors
- Contain a DNA binding domain
- Early expressed during embryogenesis
- Role in morphological boundaries and early regionalization



<http://www.gene-regulation.com/info/pax.html>

```
1  mphnsirsgg  gglnqlggaf  vngrplpevv  rqrivdlahq  gvrpcdisrq  lrvshgcvsk
61  ilgryyetgs  irpgviggsk  pkvatpkvve  kigykrqnp  tmfaweirdr  llaegvcndd
121 tvpsvssinr  iirtkvqqpf  nlpmdscvat  kslspghtli  pssavtppes  pqdsdlgsty
181 singllgiaq  pgndnkrkmd  dsdqdsclrs  idsqssssgp  rkhlrtdtfs  qhhlealecp
241 ferqhypeay  aspstkgeq  glyplllns  alddgkatlt  ssntplgrnl  sthqtypvva
301 dphspfaikq  etpelsssss  tpsslsssaf  ldlqqvgsgg  pagasvppfn  aphaasvyg
361 qftgqallsg  remvgptlpg  ypphiptsgq  gsyassaiag  mvagseysgn  ayshtpyssy
421 seawrfpnss  llsspyyyss  tsrpsappts  atafdhl
```

paired box gene 8 [Mus musculus]  
gi|6754990|ref|NP\_035170.1|[6754990]

[CDART: Conserved Domain Architecture Retrieval Tool](#)

