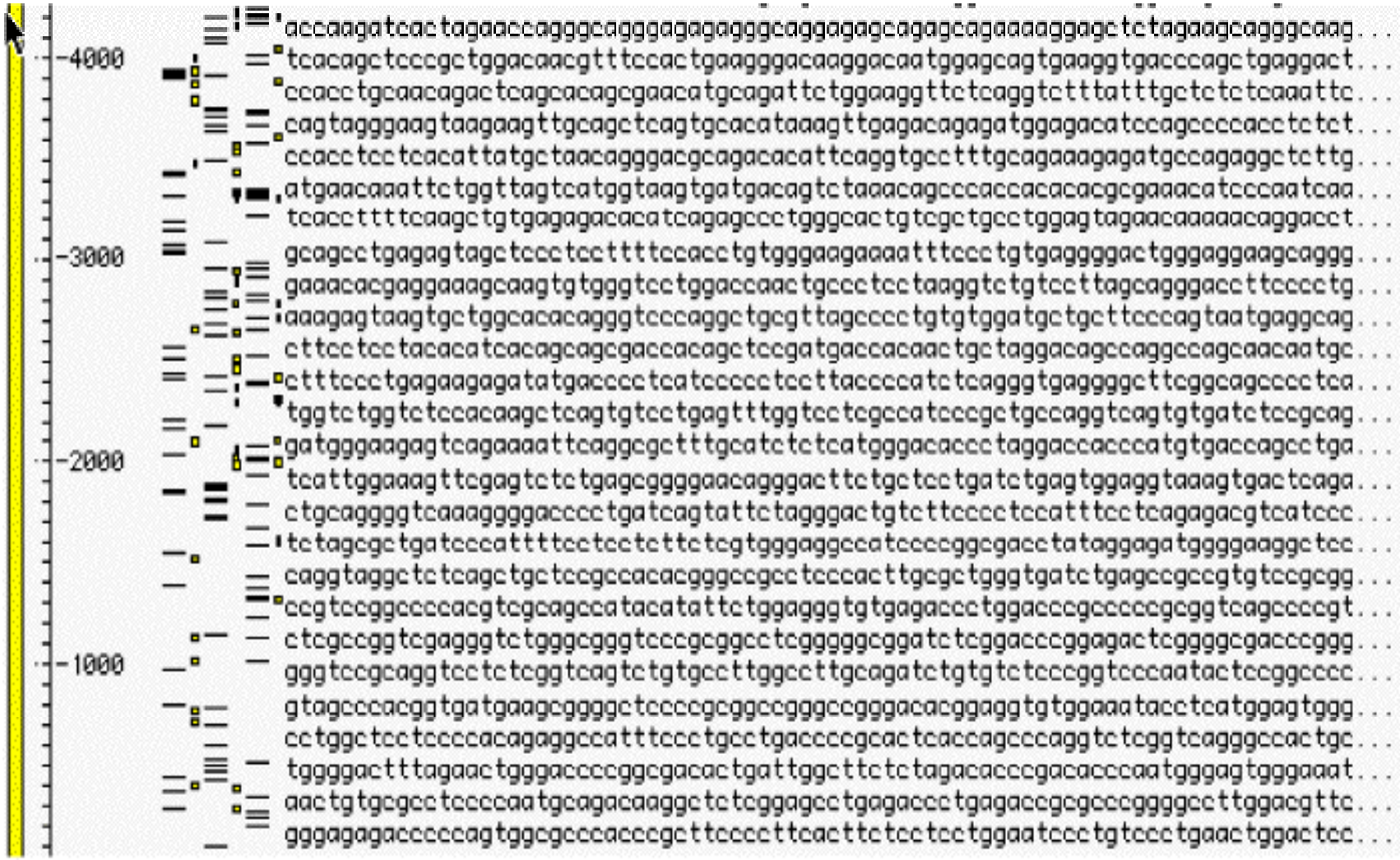
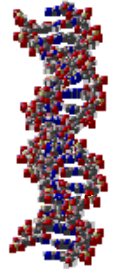


# Genomics in Medicine continued



Professor Vassie Ware  
Bioscience in the 21<sup>st</sup> Century  
December 10, 2010

## Molecular basis of disease

### Chronic myeloid leukemia:

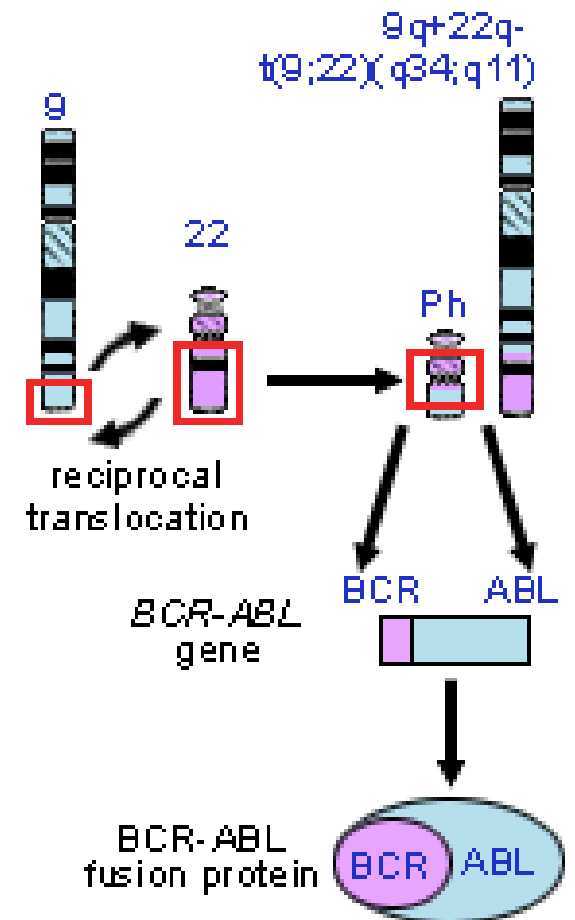
Specific chromosomal abnormality called the Philadelphia (Ph) chromosome contained within affected cells.

Ph chromosome results from translocation (exchange of genetic material) between chromosomes 9 and 22 .

This exchange brings together two genes: the *BCR* (*breakpoint cluster region*) gene on chromosome 22 and the proto-oncogene *ABL* (*Ableson leukemia virus*) on chromosome 9 to produce a hybrid gene called *BCR-ABL*.

Hybrid gene encodes a fusion protein with tyrosine kinase activity, which activates signal transduction pathways, leading to uncontrolled cell growth.

<http://www.ncbi.nlm.nih.gov/books/bookres.fcgi/gnd/gnd.pdf>



Leukemic white blood cells in CML contain a Philadelphia (Ph) chromosome, the result of a translocation between the long arms of chromosomes 9 and 22. The resulting fusion gene (*BCR-ABL*) produces an altered protein believed to play a key role in the development of CML.

# Designing Novel Therapeutics

Go to [ascb.org](http://ascb.org)

American Society for Cell Biology  
iBioSeminar by [Dr. Brian Druker](#)

***"Imatinib (Gleevec) as a  
Paradigm of Targeted  
Cancer Therapies"***

Much about human health and the genetic basis of diseases will be learned from functional studies in model organisms

The Human Genome Project will continue to have an impact on technologies and strategies to improve human health



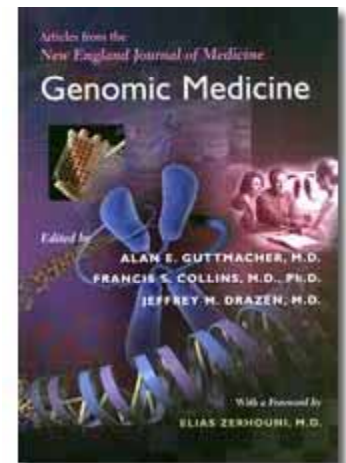
[phgfoundation.org](http://phgfoundation.org)



[cdc.gov](http://cdc.gov)



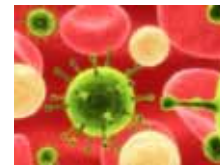
[genomicslawreport.com](http://genomicslawreport.com)





# BIOSCIENCE IN THE 21<sup>ST</sup> CENTURY:

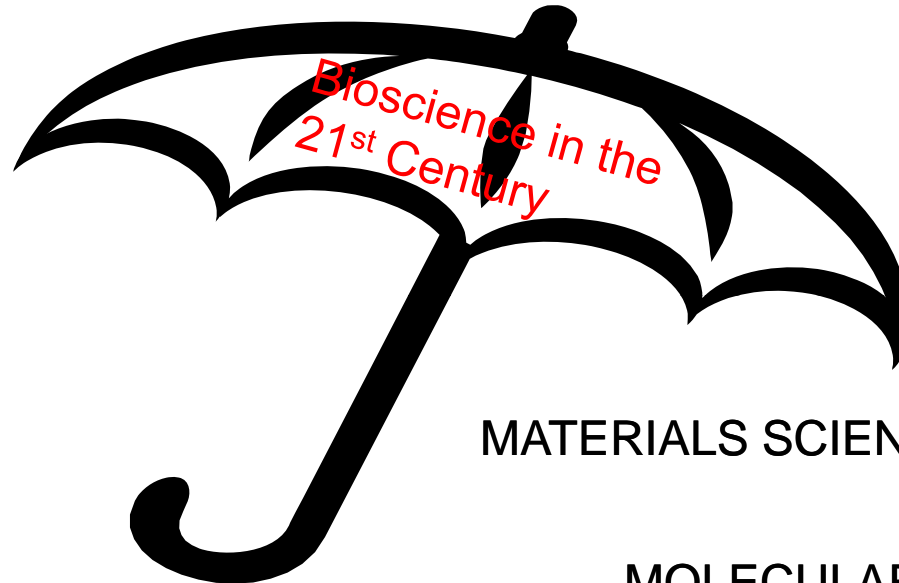
## HIGHLIGHTS AND FUTURE PROSPECTS



# BIOSCIENCE IN THE 21<sup>ST</sup> CENTURY

- What biologically-relevant problems confront society?
- What are the strategies for studying these problems?
- What are the prospects for solutions to these problems?

# MULTIDISCIPLINARY APPROACHES



NEUROBIOLOGISTS

BIOCHEMISTS

BIOLOGICAL ENGINEERS

CHEMISTS

CELL BIOLOGISTS

PHYSICISTS

CLINICIANS

MATERIALS SCIENCE ENGINEERS

MOLECULAR BIOLOGISTS

MICROBIOLOGISTS

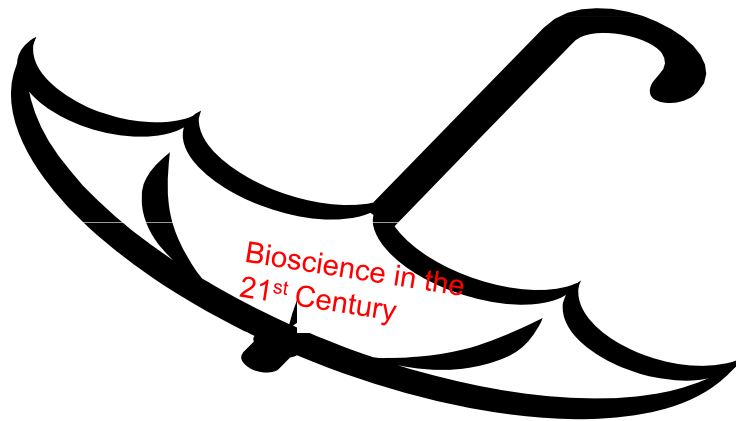
VIROLOGISTS

CHEMICAL ENGINEERS

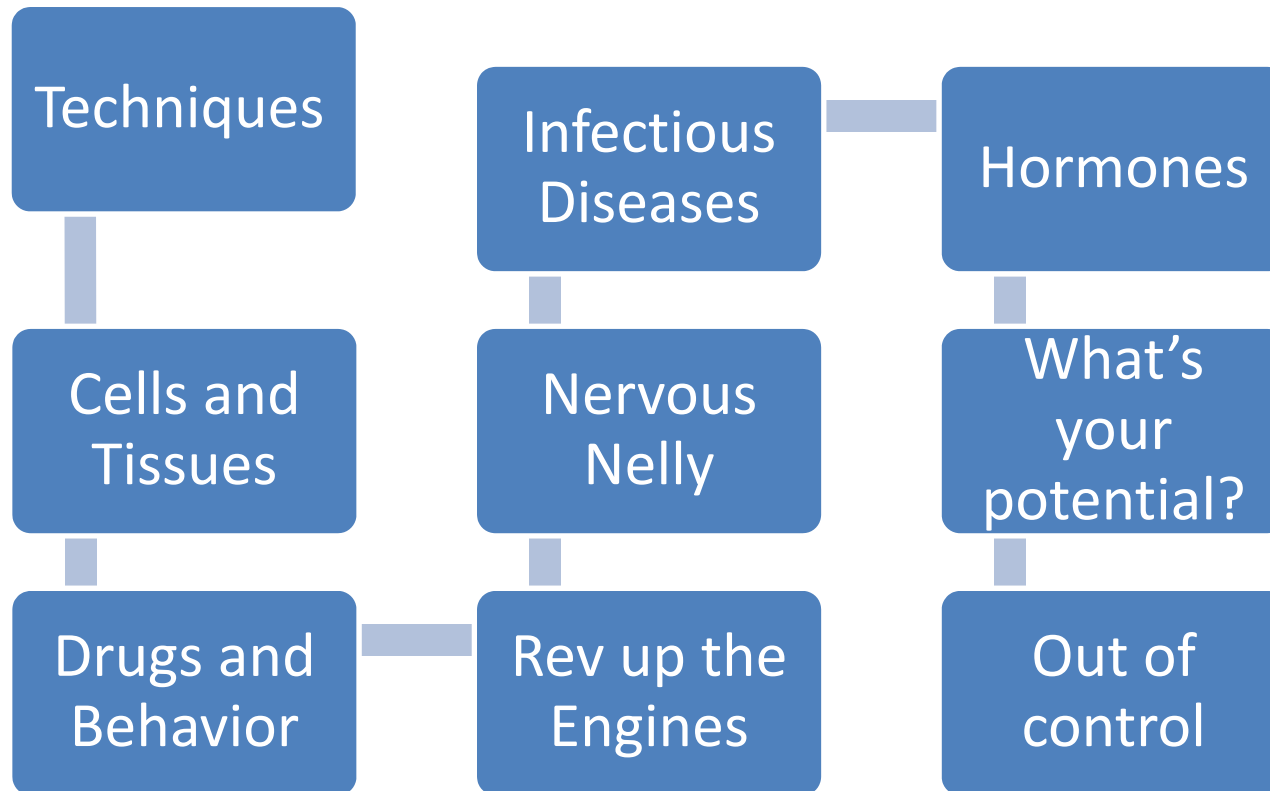
COMPUTER SCIENTISTS

# SURVEY OF TOPICS IN BIOSCIENCE

- Neurophysiological processes and behavioral science
- Cancer and novel treatment strategies
- Genomics and bioinformatics
- Stem cell biology and disease treatment prospects
- Advances in engineered biosystems , biodevices, and bioimaging
- Environmental biotechnology
- Infectious diseases
- Human physiology: cardiovascular disease, obesity



# Bioscience Jeopardy

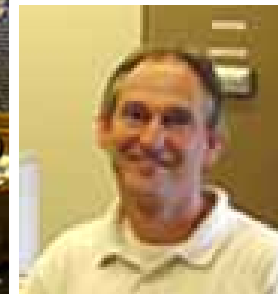


# **ACKNOWLEDGMENTS**

# Bioscience PLAYBILL: Participating Faculty and Guests

## Departments and Programs represented:

*Biological Sciences, Bioengineering, Chemical Engineering, Civil & Environmental Engineering, Chemistry, Computer Science & Engineering, Materials Science & Engineering*



**Lehigh University Participants:** Derick Brown, R. Michael Burger, Amy Camp, Brian Chen, Xuanhong Cheng, Kelli Duncan, Matthias Falk, James Gilchrist, Ned Heindel, Murray Itzkowitz, Sabrina Jedlicka, Kristen Jellison, Michael Kuchka, Stefan Maas, Linda Lowe-Krentz, Daniel Lopresti, Jutta Marzillier, John Nyby, Susan Perry, Jeffrey Sands, Neal Simon, Robert Skibbens, Vassie Ware

**Guests:** Ryan Wynne, St. Thomas Aquinas College

Joseph Frantz, Sanofi Pasteur

John Glod, Robert Wood Johnson Medical School, UMDNJ

American Society for Cell Biology, iBioSeminars© lectures by Joseph DeRisi,  
Brian Druker

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**THANK YOU!**