Next Generation Sequencing, Pipeline Development, and Data Analysis

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Overview

- Overview of Bioinformatics
- Next Generation Sequencing
- Data Analysis
- Genome Assembly
- Downstream Analysis
- Results/Comparisons
- Conclusion
- References

Overview of Bioinformatics

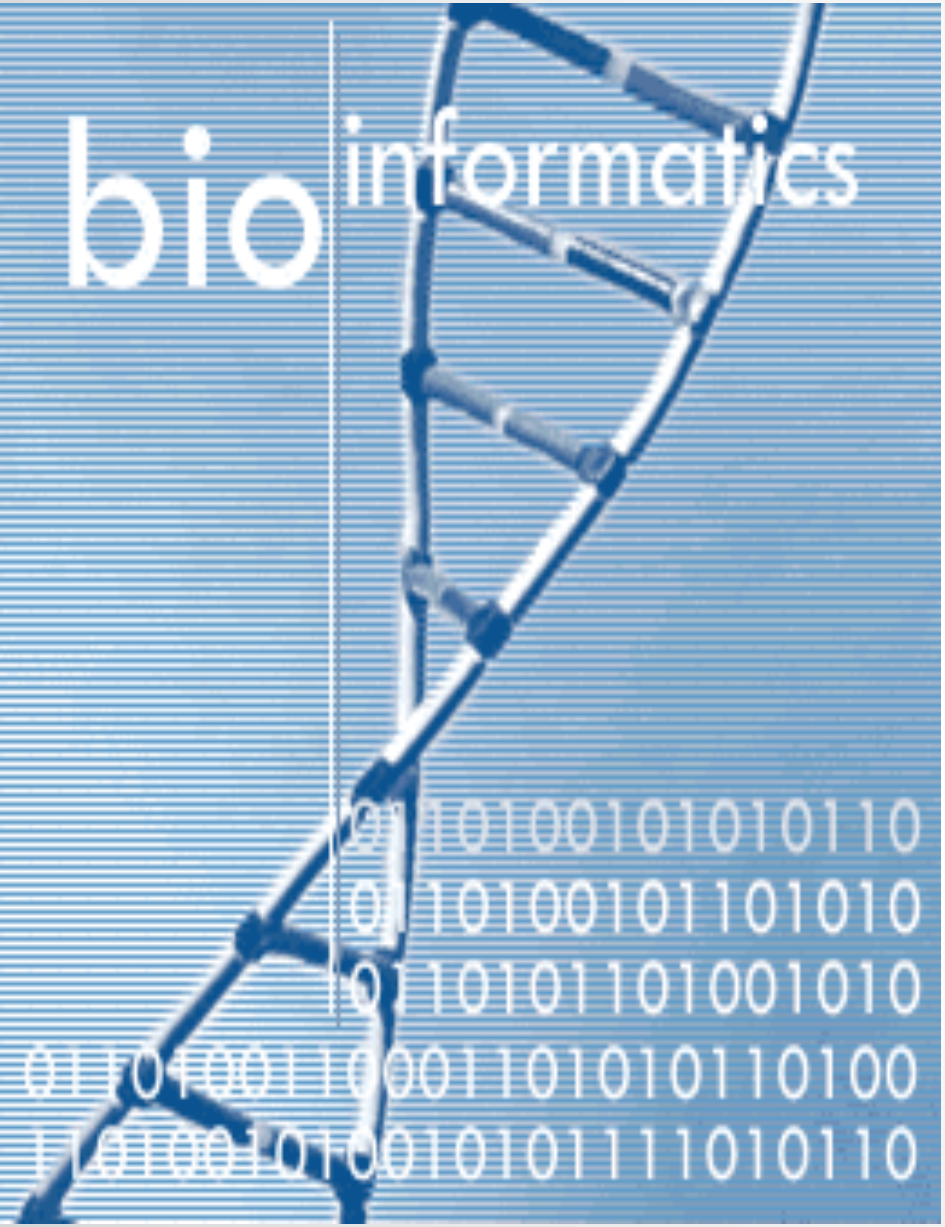


Image taken from Scripps Translational Science Institute

- Encompasses Multiple Scientific Disciplines
- Software Development
- Data Management
- Knowledge Discovery

Image taken from Applied Biosystems

Roche 454 SEQUENCING

Image taken from 10th Cyanobacterial Molecular Biology Workshop

illumina®

Image taken from Mobile Health 360

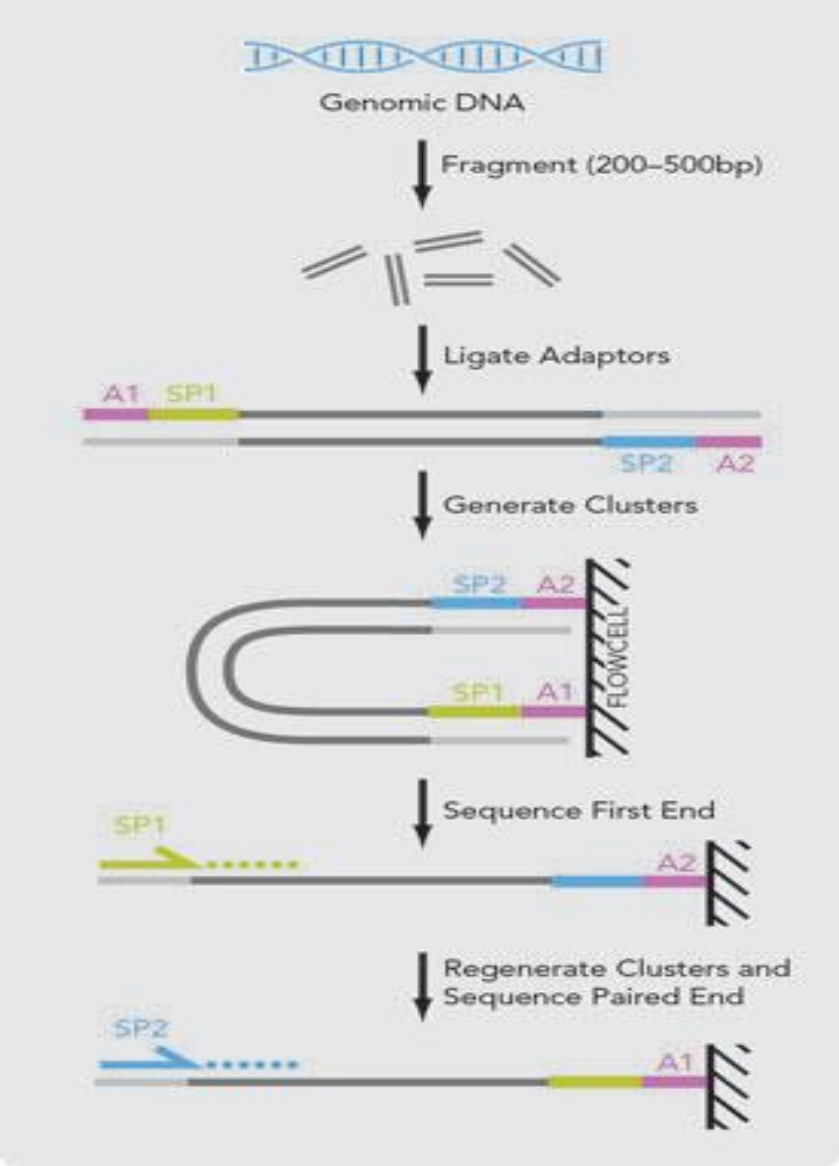
Helicos BioSciences Corporation

Image taken from Xconomy

AB Applied Biosystems

Image taken from Industrial Exhibition 2004

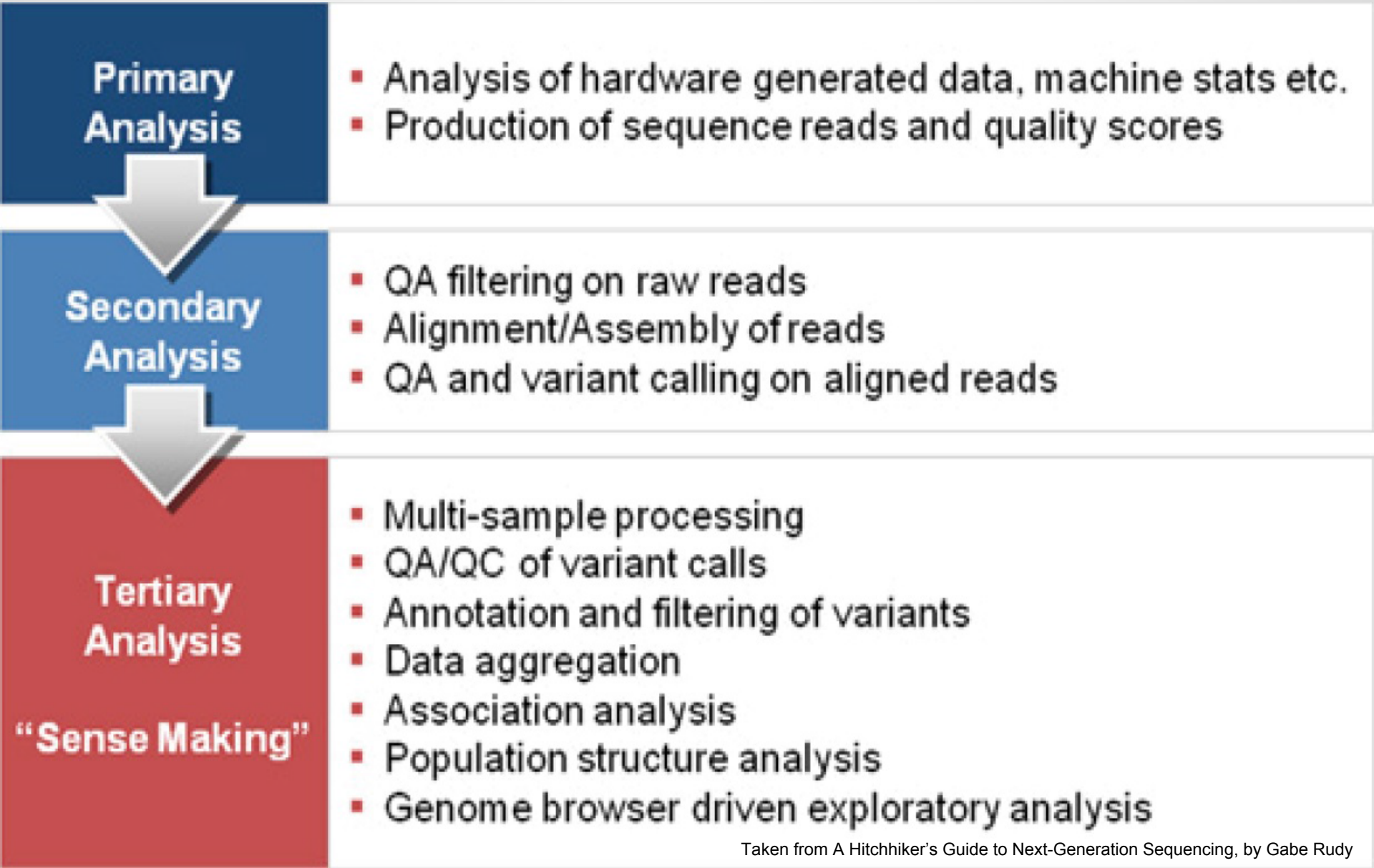
Assembly



- Single End Sequence Assembly
- Paired End Sequencing Assembly
- Which is Preferred?

Image taken from Illumina

Data Analysis



Taken from A Hitchhiker's Guide to Next-Generation Sequencing, by Gabe Rudy

Downstream Analysis

- BLAST (Basic Local Alignment Search Tool)

contig09789 : NODE_52575_length_348_cov_3.548851, NODE_97374_length_772_cov_4.497409, NODE_204370_length_106_cov_2.075472, NODE_284311_length_72_cov_4.611111, NODE_514121_length_244_cov_2.102459

contig09788 : NODE_138945_length_196_cov_2.464286, NODE_246064_length_161_cov_2.614907

contig09783 : NODE_14623_length_1135_cov_3.317181, NODE_23403_length_416_cov_3.625000, NODE_57393_length_270_cov_2.614815, NODE_160727_length_508_cov_3.454724, NODE_198812_length_374_cov_3.762032, NODE_306930_length_186_cov_3.284946, NODE_311476_length_111_cov_7.243243, NODE_346931_length_216_cov_2.680556, NODE_511004_length_133_cov_2.015038, NODE_537359_length_317_cov_3.987382, NODE_547876_length_181_cov_2.331492

- MUMmer (Maximum Unique Matches)

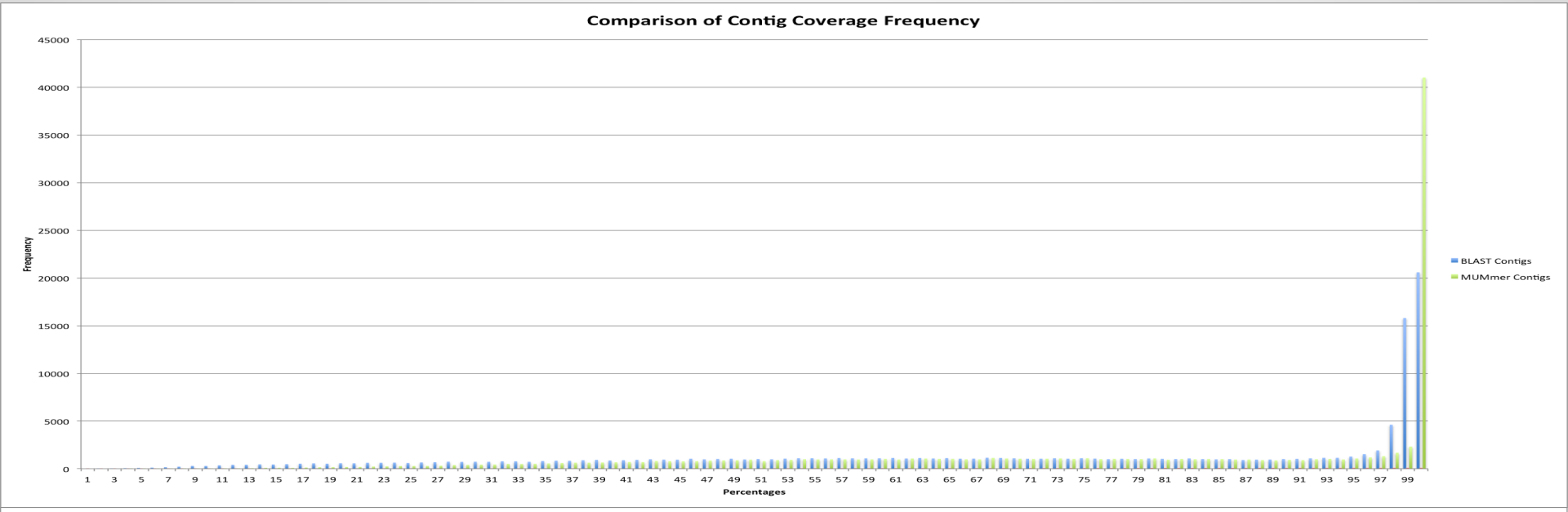
contig122151 : NODE_145039_length_491_cov_3.128309

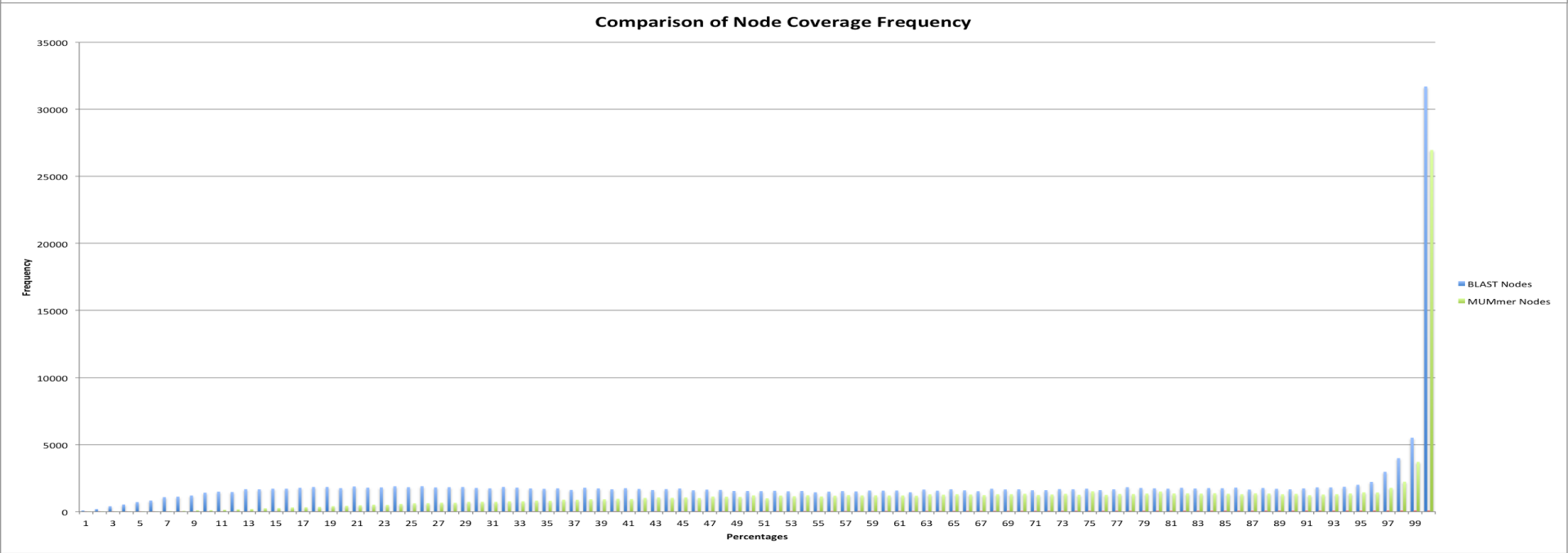
contig09789 : NODE_79919_length_122_cov_3.483607, NODE_204370_length_106_cov_2.075472, NODE_173926_length_330_cov_3.427273, NODE_97374_length_772_cov_4.497409, NODE_97374_length_772_cov_4.497409, NODE_97374_length_772_cov_4.497409

contig09788 : NODE_469389_length_516_cov_2.474806, NODE_259071_length_143_cov_2.237762, NODE_373623_length_457_cov_2.916849, NODE_194630_length_141_cov_2.801419, NODE_138945_length_196_cov_2.464286, NODE_138945_length_196_cov_2.464286, NODE_138945_length_196_cov_2.464286

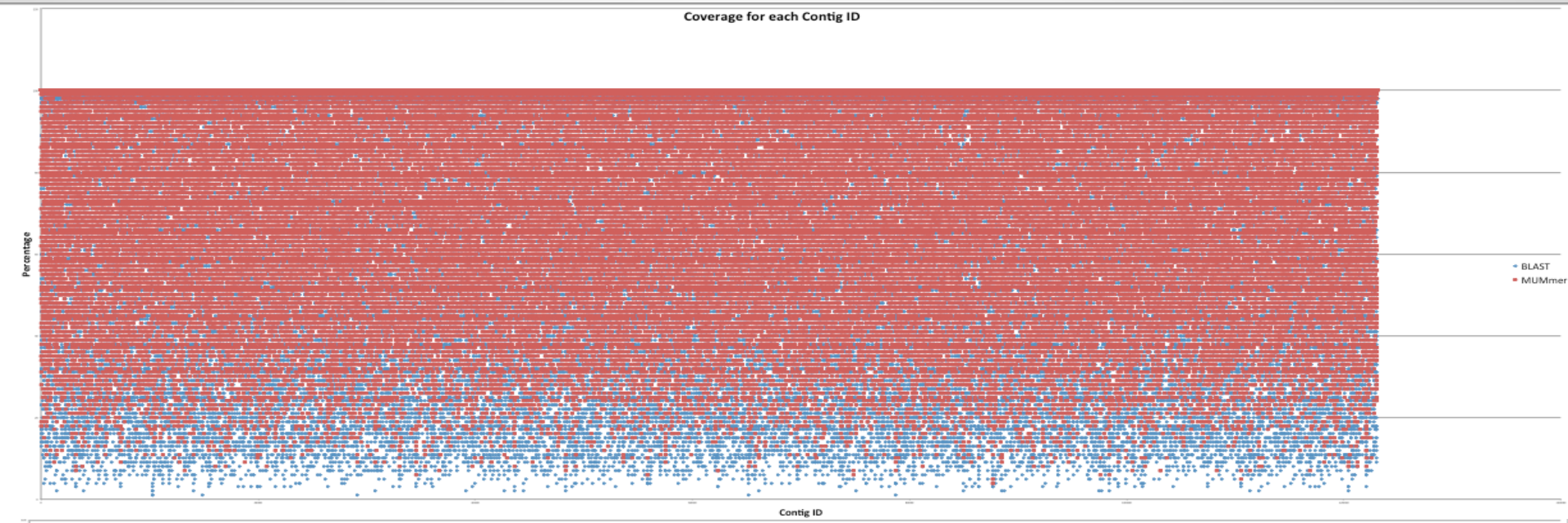
contig68189 : NODE_120143_length_513_cov_4.403509

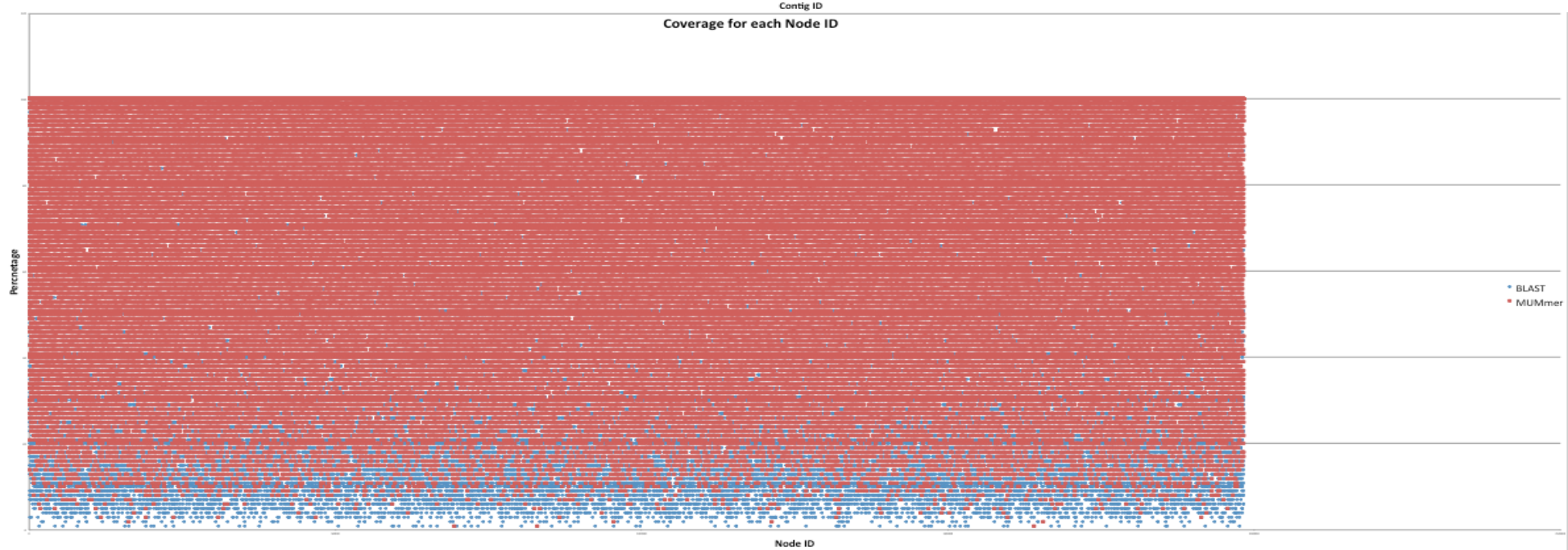
Results/Comparisons



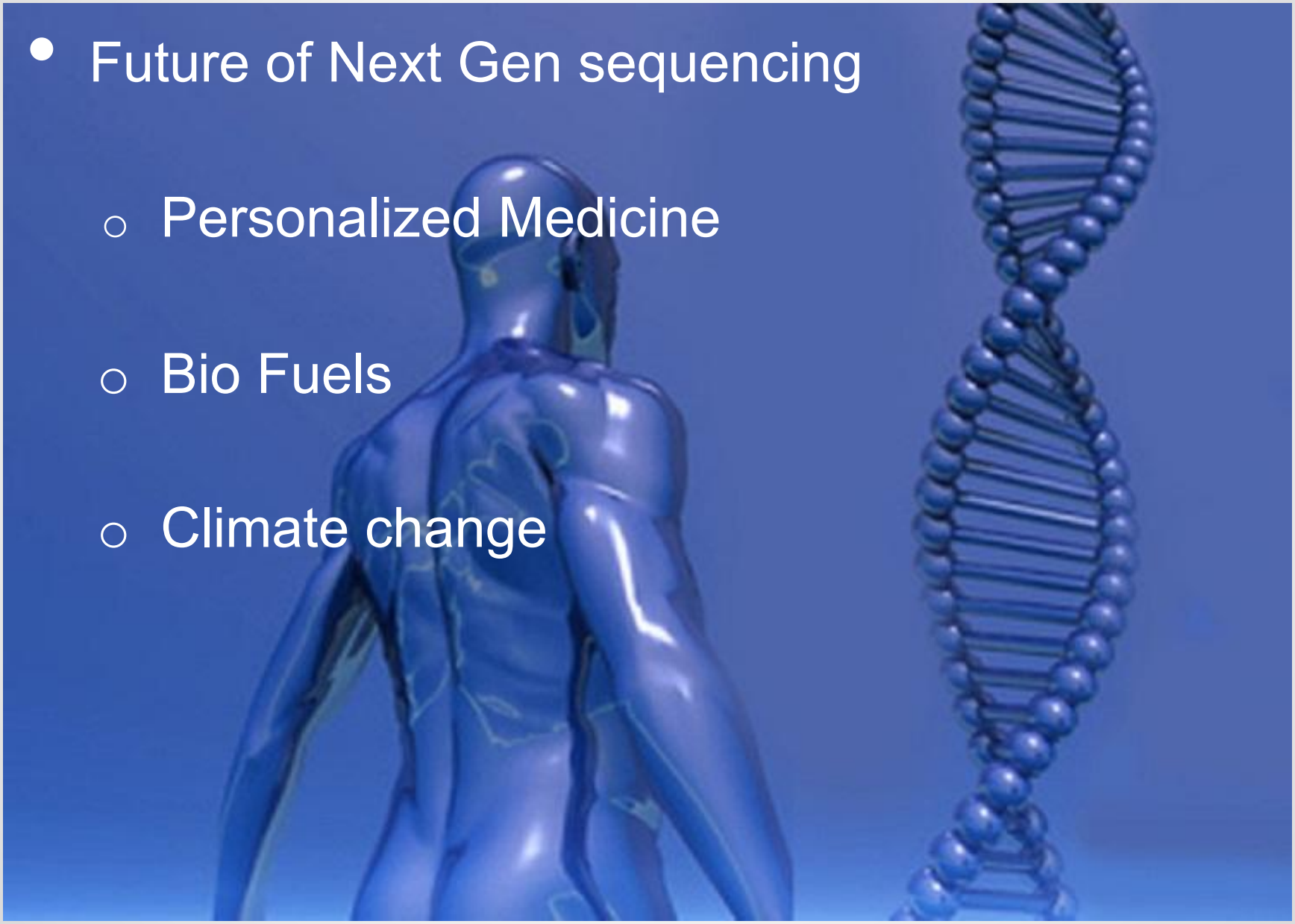


Results/Comparisons





Conclusion



- Future of Next Gen sequencing
  - Personalized Medicine
  - Bio Fuels
  - Climate change

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Thank you!

Acknowledgements:

- CSURE (Computational Science for Undergraduate Research Experiences)
- University of Tennessee

Questions?