Genomic Visualization and Analysis with IMAS

Chris D. Shaw, School of Interactive Arts & Technology, Simon Fraser University, Surrey, BC

Available at: <u>http://biov.iat.sfu.ca/IMASProjectWeb</u>, shaw@sfu.ca

IMAS helps analysis of Microbial DNA by

- Finding genes with Glimmer 3
- BLAST Aligning similar genes / proteins
- Finding Motifs with Hmmer
- Multialigning like genes / proteins with ClustalW

IMAS Integrates analysis and display

- Zoomable along sequence Horizontally
- Selectable detail Vertically
- Maintains a sequence analysis data collection
- · Visual display aligned to sequence
- Integration of commonly-used sequence analysis tools into single interactive zoomable framework

IMAS: Zoomed in



SCHOOL OF INTERACTIVE

ARTS + TECHNOLOGY

BLAST Local Data





Plot percent identity:

- Computed via BLOSUM log-odds matrix for AA pairs.
- · Computed via Codon identity for NTs.
- · If Codons encode different AAs, compute AA similarity w/BLOSUM

HMMPfam on local data

Syntenic visualization of related Microbes



Zoomed Out x 30 with Percent identity in syntenic connectors

| 2 Rricketts110000 12 Rricketts1100006 | |
|--|--------------|
| 1 Rrickettsi100007 | |
| Rickettsia conorii str. Halish 7, complete genome | |
| 3 G-antigen expor 3 G-antigen export syste 3 | 63 unkn 63 |
| 2 unknown | |
| Rickettsia akari str. Hartford, complete genome | |
| 1 G-antigen expor 📴 G-antigen export syste | -1 UDP-N-ace |
| 3 putative bifunctional glutamate synthase subunit beta/2-polyprenylphenol hydroxylase | |
| Rickettsia provazekii str. Madrid E, complete genome | |
| 2 G-ANTIGEN EXPOR | |
| 1 O-ANTIGEN EXPORT SYSTE | |

Used at the CDC Viral & Rickettsial Zoonoses Branch to help annotate *Orientia Tsutsugamushi* (Greg A Dasch, Marina E. Eremeeva)

Written in C++ **Rapid** visualization response -- average 25ms zoom response time **Integrated** common tools **Local** databases

Thanks to: Natural Sciences & Engineering Research Council Canada

SCHOOL OF INTERACTIVE ARTS + TECHNOLOGY [SIAT] | WWW.SIAT.SFU.CA