



Colorado State University, June 2-8, 2019

Pre-Workshop Clinic (10 AM – 4 PM)

Sunday, June 2, 2019

Room 304-306 Lory Center

10:00-10:15	Welcome, introduction to workshop laptops Instructors and Joe Strecker
10:15-10:45	Introduction to computers and computing environments Mark Stenglein
10:45-12:15	The UNIX command line Bob Fitak
12:15-1:15	Lunch onsite
1:15-2:30	Command line, continued Mark Stenglein
2:30-2:45	Coffee break
2:45-4:00	Introduction to R Bob Fitak

Registration (5:30 – 6:30 PM)

Sunday, June 2, 2019

Room 304-306 Lory Center

Welcome and Opening Reception (6:30-9:30 PM)

June 2, 2019

Longs Peak Room, Lory Center

6:30-6:45

Welcome and Opening Remarks

Jill Pecon Slattery and Sue VandeWoude

6:45-7:30

10 Attendee Presentations
Attendees

Sue as MC

7:30-8:00ish

Introduction to Group Projects

Bob Fitak

6:30-9:30

Refreshments and Social Time

Day 1: NGS Data Overview, Genome Mining

June 3, 2019

Lory Center Room 304-306

7:00 – 8:00	Breakfast	Rams Horn Dining Center
8:15-8:25	Step 1: What are my NGS tools for wildlife disease research? Jill Pecon-Slattery	
8:25-8:35	Introduction to computers Joe Strecker	
8:35-10:00	Intro to genomics and NGS Mark Stenglein	
10:00-10:20	Coffee Break and Meet Invited Speaker	
10:20-12:15	Sequence alignment and BLAST Bob Fitak and Mark Stenglein	
12:15-1:15	Lunch Provided Onsite	
1:15-2:15	10 Attendee Presentations Sue as MC	
2:15 -3:15	BLAST exercises Bob Fitak and Mark Stenglein	
3:15-4:00	Data: Quality Control and Processing (Lecture and Lab Mark Stenglein and Bob Fitak	
4:00-5:00	Tour of Veterinary Hospital	
5:00-7:00	FREE TIME AND DINNER	Rams Horn Dining Center
7:30-9	Optional Computer Time with Instructors	Longs Peak Room

Day 2: Genome Assembly, Whole Genome Alignments, Metagenomics

June 4, 2019

Lory Center Room 304-306

7:00 – 8:00	Breakfast	Rams Horn Dining Center
8:15-8:25	Step 2: Best Practices for Generating Quality Genomes of Host and Pathogen-where are we? Jill Pecon-Slattery	
8:25-9:30	Mapping to Reference Genome: Good, Bad Ugly Mark Stenglein and Bob Fitak	
9:30-10:00	CSU Flash talk Karen Fox , Colorado Parks and Wildlife	
10:00-10:20	Coffee Break and Meet Invited Speaker	
10:20-11:15	Mapping Exercises Bob Fitak and Mark Stenglein	
11:15-12:15	Genome Assembly lecture Mark Stenglein	
12:15-1:15	Lunch Provided Onsite	
1:15-3:15	Genome assembly exercises Mark Stenglein and Bob Fitak	
3:15-3:35	Coffee Break	
3:35-4:35	Genome assembly exercises continued and introduction to metagenomics and disease lecture Mark Stenglein and Bob Fitak	
4:35-5:00	Group Projects Time Jill, Bob, Chris, Mark will be on hand to help as participants work on their scenario	

5:00-7:00	FREE TIME AND DINNER	Rams Horn Dining Center
7:30-8:30	Plenary Speaker Loren Cassin-Sackett, University of South Florida	Longs Peak Room
8:30-10:00	Social Time with Invited Speaker	Longs Peak Room

Day 3: Comparative Genomic and Phylogenomic Inferences

June 5, 2019

Lory Center Room 304-306

7:00 – 8:00	Breakfast	Rams Horn Dining Center
8:15-8:25	Step 3: Comparing Differences Within and Between Genomes Jill Pecon Slattery	
8:25-9:00	Introduction to Multiple Sequence Alignments of Targeted & Whole Genomes Jill Pecon Slattery	
9:00-9:30	Alignment Computer Lab: Part 1 Aliview, Mafft, Muscle, Clustal Omega Jill Pecon Slattery and Justin Lee	
9:30-10:00	CSU Flash Talk Sue VandeWoude and Jenn Malmberg	
10:00-10:20	Coffee Break and Meet Invited Speakers	
10:20-10:50	Alignment computer lab: Part 2 Aliview, Mafft, Muscle, Clustal Omega, PRANK Jill Pecon Slattery and Justin Lee	
10:50-11:30	The basics of phylogenomic trees: Models, Search Algorithms, Tree Scores, Topology Roman Biek	
11:30-12:00	Phylogenomic Inferences of host/pathogen Jill Pecon-Slattery	
11:45-12:15	Group Projects Sessions	
12:15-1:15	Lunch Provided Onsite	
1:15-3:15	Phylogenomic Reconstruction Lab: jModeltest ML, ME MP, MCMC demo Jill Pecon Slattery, Justin Lee, Roman Biek, Bob Fitak	

3:15-3:35	Coffee Break	
3:35-5:00	Phylogenomic Reconstruction Lab: MrBayes Justin Lee	
5:30-7:00	FREE TIME AND DINNER	Rams Horn Dining Center
7:30-8:30	Plenary Speaker Roman Biek, University of Glasgow	Longs Peak Room
8:30-9:30	Social Hour with Invited Speaker	

Day 4: Tree-based Inferences in Host-Pathogen Ecology and Evolution: Clocks, Transmission and Adaptation

June 6, 2019

Lory Center Room 304-306

7:00 – 8:00	Breakfast	Rams Horn Dining Center
8:15-8:25	Step 5: Genomics of Host-pathogen Interaction	
8:35-9:30	Intra-Host Pools Pathogen	
	Mark Stenglein	
9:30-10:00	CSU Flash Talk	
	Rebekah Kading/Anna Fagre	
10:00-10:20	Coffee Break and Meet Invited Speaker	
10:20-11:15	Lectures: Intro to concepts of molecular clocks, timescale, patterns of neutral evolution, TMRCA	
	Roman Biek	
11:15-12:15	Labs BEAST Part 1	
	Justin Lee	
12:15-1:15	Lunch Provided Onsite	
1:15-2:15	Labs BEAST Part 2	
	Roman Biek and Justin Lee	
2:15-2:45	Lecture: Phylodynamics of Measurably Evolving Pathogens	
	Roman Biek	
2:45-3:15	Lecture: Signals of Selection in Host Genome	
	Jill Pecon-Slattery	
3:15-3:25	Short Coffee Break	
3:25-4:15	Computer Labs: Selection, Adaptation, Variant Detection: PAML and HyPhy	
	Jill Pecon-Slattery	

4:45-6:30	HIKE, Weather Permitting Edit Szalai
5:00-7:00	FREE TIME AND DINNER
7:00-9:00	Optional Computer Lab and Time with Instructors

Day 5: Population Phylogenomics and Landscape Genomics

June 7, 2019

Lory Center Room 304-306

7:00 – 8:00	Breakfast	Rams Horn Dining Center
8:15-8:25	Step 4: Applying my genomic tools across populations within host & pathogen Jill Pecon Slattery	
8:25-9:30	Population Genomics 101 Chris Funk	
9:30-10:00	CSU Flash Talk Christie Mayo/?	
10:00-10:20	Coffee Break and Meet Invited Speaker	
10:20-11:00	Population Genomics 101 (cont) Chris Funk	
11:00-11:30	Host Population Genomics in Disease: Landscape Genomics Daryl Trumbo	
11:40-12:15	Computer Lab: Population Genomics Chris Funk & Daryl Trumbo	
12:15-1:15	Lunch Provided Onsite	
1:15-3:15	Computer Lab: Population Genomics Chris Funk & Daryl Trumbo	
3:15-3:35	Coffee Break	
3:35-5:00	Computer Lab: Population Genomics Chris Funk & Daryl Trumbo	
6:00-?	Party Downtown Fort Collins	

DAY 6: Putting it all together: your Group Projects

June 8, 2019

Lory Rm 304-306

7:00-8:15	Breakfast	Rams Horn Dining
8:15-8:20	Step 6: Our Workflow & GDW2019 Publication Frontiers in Ecology and Evolution Jill, Bob, Sue, Chris, Mark	
8:20-9:00	Scenario: Group 1	
9:00-9:40	Scenario: Group 2	
9:40-10:00	Coffee Break	
10:00-10:40	Scenario: Group 3	
10:40-11:20	Scenario: Group 4	
11:20-11:40	Concluding Remarks & Farewells All instructors & participants	