Geologic Overview:
Park City,
Heber Valley,
Strawberry Valley,
Utah

Janis Boettinger
Utah State University
Geology of Utah
Geology of Utah

- Physiographic Provinces
Geology of Utah

- Physiographic Provinces
  - Basin and Range
Geology of Utah

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  - Basin and Range
  - Colorado Plateau
Geology of Utah

- Physiographic Provinces
  - Basin and Range
  - Colorado Plateau
  - Middle Rocky Mountains
Geology of Utah

- Physiographic Provinces
  - Basin and Range
  - Colorado Plateau
  - Rocky Mountains
Structural Features:
Cheyenne Suture, Uinta Trough
Continental Collision and Rift

- **1.7 bya**
  - Cheyenne suture belt
  - Weakly welded crust

- **1.0 bya**
  - Rodinia supercontinent

- **850 mya**
  - Rift @ Cheyenne suture belt
  - Uinta trough

- **725 mya**
  - N-S rift
  - Thinned crust to central Utah
Structural Features: Utah Hinge Line
Paleozoic to Early Mesozic (Mid-Triassic)

- Utah tectonically quiet, tropical
  - West of hinge line
    - Subsiding basin (Nevada, W Utah)
    - Thick marine deposits
  - East of hinge line
    - Continental shelf
    - Thin beach, coastal plain, shallow marine deposits
Mesozoic

- North American plate collides with Farallon plate
- Farallon plate subducts under North American plate
**Mesozoic**

- **Mid-late Triassic**
  - Volcanoes in California, Arizona
  - Ashy sediments

- **Early Jurassic**
  - Move into hot, dry trade winds
  - New mountains to west block coastal precipitation
  - Desert
Mesozoic
(Late Triassic-Early Jurassic)

- West of Utah hinge line
  - Interior sea
    - Marine deposits
- East of Utah hinge line
  - Transition
    - Sea margin
    - Inland desert
Mid-Late Mesozoic

- Subduction of Farallon plate continues
  - Zone of structural deformity migrates east into Utah
  - Rock sheets folded, thrust eastward over younger rock
    - Sevier orogeny
    - Sevier thrust belt
Structural Features: Thrust faults
Structural Features: Thrust Faults

- Charleston-Mt. Nebo thrust fault
  - Paleozoic (Mississippian) rocks thrust over Mesozoic (Triassic) rocks
Cenozoic
(Early Tertiary)

- **Farallon plate**
  - Subduction continues
  - Subduction angle lessens

- **Structural deformity zone migrates eastward**
  - West of Utah hingle line
    - Thrusting of rock sheets
  - East of Utah hingle line
    - Basement-cored uplifts
      - Laramide orogeny
Laramide Orogeny

- Most structures oriented North-South
  - Compressional stresses oriented East-West
    - Rocky Mountain structure
      - Basement-cored uplifts bounded by high angle faults
    - Colorado Plateau structure
      - Sedimentary rocks deformed over fractured basement rocks

- Uinta Mountains and Cottonwood Uplift
  - Oriented East-West
  - Pushed up along Cheyenne suture zone
Structural Features:
Uinta Arch, Cottonwood Uplift
Cenozoic (mid Tertiary)

- Plate tectonics
  - North American plate overrides Fallon plate

- Crust extends, thins
  - Detachment faulting
Cenozoic (mid Tertiary)

- Igneous Intrusions
  - Over-thickened crust
    - Formed in Cheyenne suture
      - Seveir, Laramide orogenies
    - Isostatically sagged into upper mantle
  - Detachment reduced crustal load
    - Isostatic rebound and decompression melting of lower crust
  - Siliceous igneous intrusions
    - Granite-like stocks, dikes, volcanoes
      - Wasatch igneous belt
Structural Features:
Detachments, Igneous Belt
Cenozoic
(Late Tertiary to Quaternary)

- North American plate
  - Overrides East Pacific rise
  - Encounters rotating Pacific plate
  - Western part pulled away
  - Extension and detachment faulting accelerated

- West of hinge line
  - Extension, detachment faulting
    - Basin and Range

- East of hinge line
  - Uplift - isostatic rebound
    - Middle Rocky Mountains
    - Colorado Plateau

- Wasatch fault
  - Hinge line, boundary
Structural Features:
Wasatch fault, Heber valley
**Field Tour**
(Late Cenozoic)

- **Park City**
  - Wasatch igneous belt
  - Glaciation

- **Heber Valley**
  - Basin and Range
  - Half-graben

- **Strawberry Valley**
  - Basin and Range-Colorado Plateau transition zone
  - Fault-controlled valley
  - Some Colorado Plateau formations