INTRODUCTION TO THE AUTUMN SKY
(Duration: 1.5 - 2 hrs)

Summary of Presentation

INTRODUCTION TO STELLARIUM: BEGINNING USAGE
• Open source cross-platform free planetarium software
• Useful in Observing Exercises
• Demonstration of most frequently used controls
  • toggles - constellations, grids, ground
  • drag & move
  • search for Andromeda galaxy
  • zoom function

The Status Bar
• Location
• Field of View
• Frame Rate
• Date
• Time (ref to Universal Time)

Side Controls - Setup/Customization
• Location on the Earth
• Time & Date Setting
• Sky & Viewing Options
• Search Window
• Configuration Window
• Help

Bottom Controls - Most Frequent Usage
• Constellation Lines
• Constellation Labels
• Constellation Art
• Equatorial Grid
• Azimuthal Grid
• Ground
• Cardinal Points
• Atmosphere
• Night Mode
• Quit
**Quick Introduction to the Autumn Sky**

*Review of North Circumpolar Sky Constellations*
- review terminology & constellations from Planetarium Session 1
- the altitude of North Celestial Pole corresponds to the observer’s latitude
  - also radius of NCP circular cap
    - stars within the cap are seen all night long all year round, never rising or setting
- Aside: can be demonstrated with a simple geometric proof

*Introduction to the Constellations in Season*
- stars that rise and set
- seen early in the evening

**The Equatorial Coordinate System**
- apparent path of stars across the celestial sphere used to introduce the equatorial coordinate system
  - celestial equator is fundamental reference circle
  - declination - N & S of celestial equator
  - hour circles of Right Ascension 0-24h from W to E
- provides fixed coordinates for stars cf alt-azimuth system
- inclined to alt-azimuth system by colatitude (angle of rising & setting)
- practical usage
  - sidereal time - what stars are in the sky?
  - determine time object in sky

**The Magnitude System & Distance Determination**
- Apparent Visual Magnitude
  - combination of intrinsic brightness & distance
  - Hipparchus’ brightness numbering scheme
    - brightest magnitude 1, faintest magnitude 6, equal steps of brightness by eye
    - eye has a nonlinear response to brightness
  - regularizing Hipparchus’ scheme
    - define 5 magnitude change to correspond to a 100-fold change in brightness
    - so 1 magnitude change corresponds to ~2.5 change in brightness
    - 2 magnitudes ~6.25 (or 2.5 x 2.5) change in brightness (note multiplication not addition)
- Absolute Visual Magnitude
  - removes accident of distance so measure of intrinsic brightness
  - magnitude at 10 parsecs (definition of parsec and equivalence in light years)
  - knowing both magnitudes allows distances to be determined (standard candles)
CONSTELLATIONS

- **Boötes the Herdsman**
  - contains the asterism of the Kite
- **Corona Borealis the Northern Crown**
- **Hercules**
  - contains the asterism of the Keystone
  - kneels on the head of the Dragon
- **Lyra the Harp**
  - the bright star Vega is part of the asterism of the Summer Triangle
- **Cygnus the Swan (First Nations’ Canada Goose flying down the Milky Way in fall)**
  - asterism of the Northern Cross
  - the bright star Deneb is part of the asterism of the Summer Triangle
- **Aquila the Eagle**
  - the bright star Altair is part of the asterism of the Summer Triangle
- **Ophiuchus the Serpent Bearer**
- **Serpens Cauda & Caput**
- **Pegasus the Winged Horse**
  - contains the asterism of the Great Square
  - number of stars within the square indicate atmosphere’s transparency
- **Andromeda**
  - the great galaxy in Andromeda found by waltzing
    - 2.2 million light years distant
    - farthest object seen with the naked eye
- **Sagittarius the Archer**
  - contains the asterisms of the teapot and teaspoon
  - direction to the centre of our Galaxy
- **Scorpius the Scorpion**
- **Libra the Scales**
- **Capricornus the Sea Goat**
  - asterism of the Big Smile

REFERENCE HANDOUTS

- Notes on Observing
- General Information on Observing
- StarCharts
- Observing Exercises