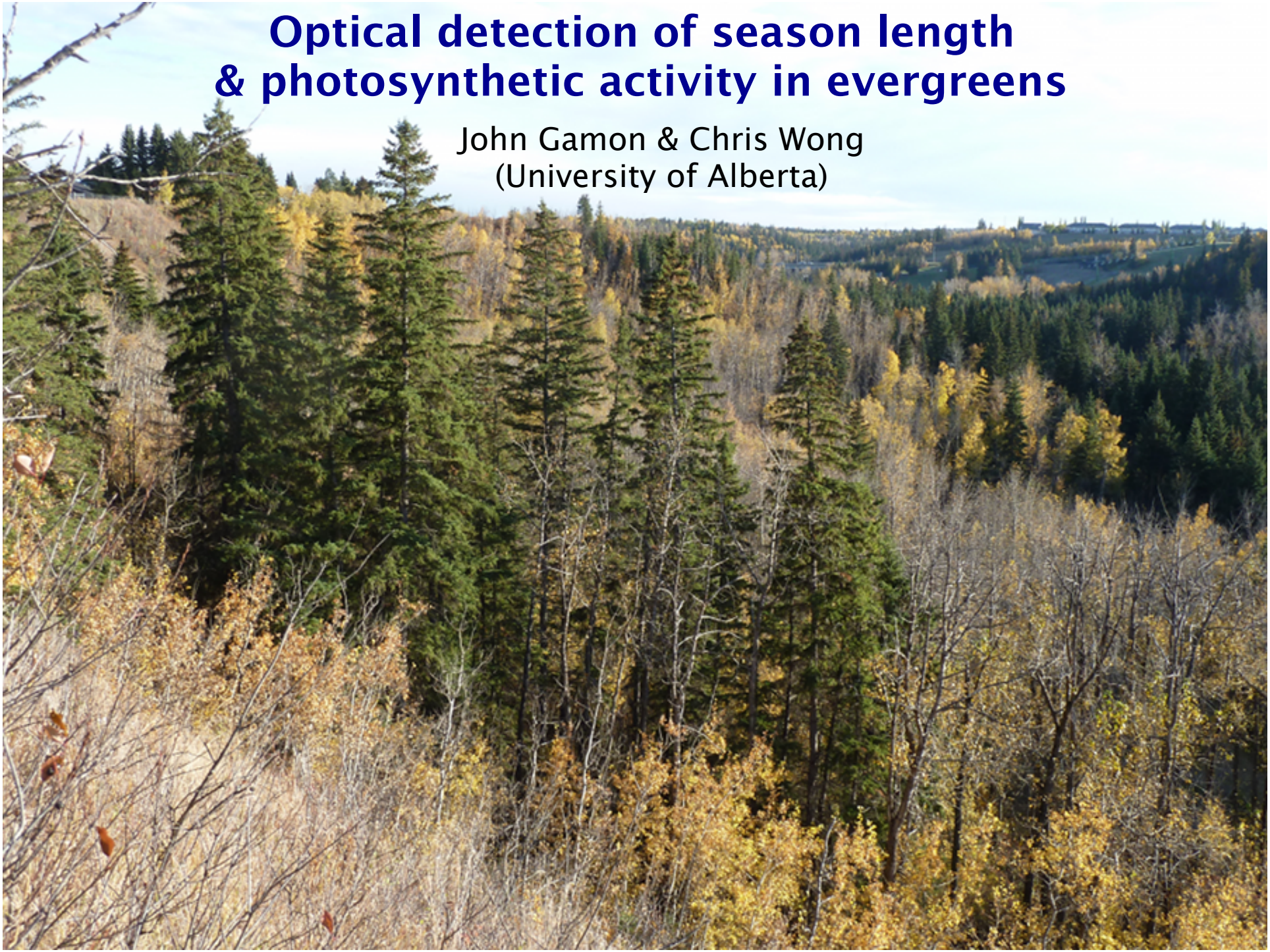
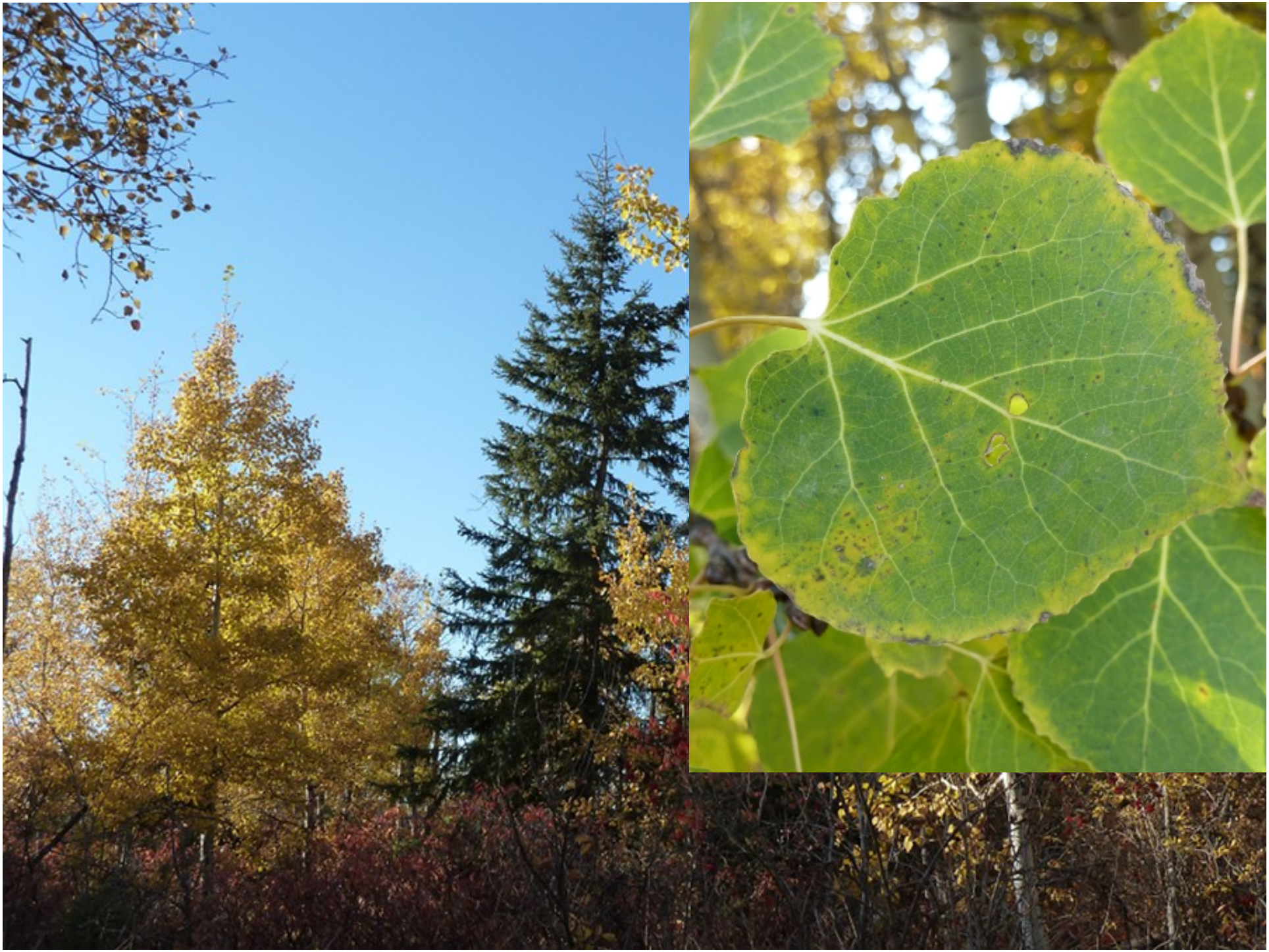
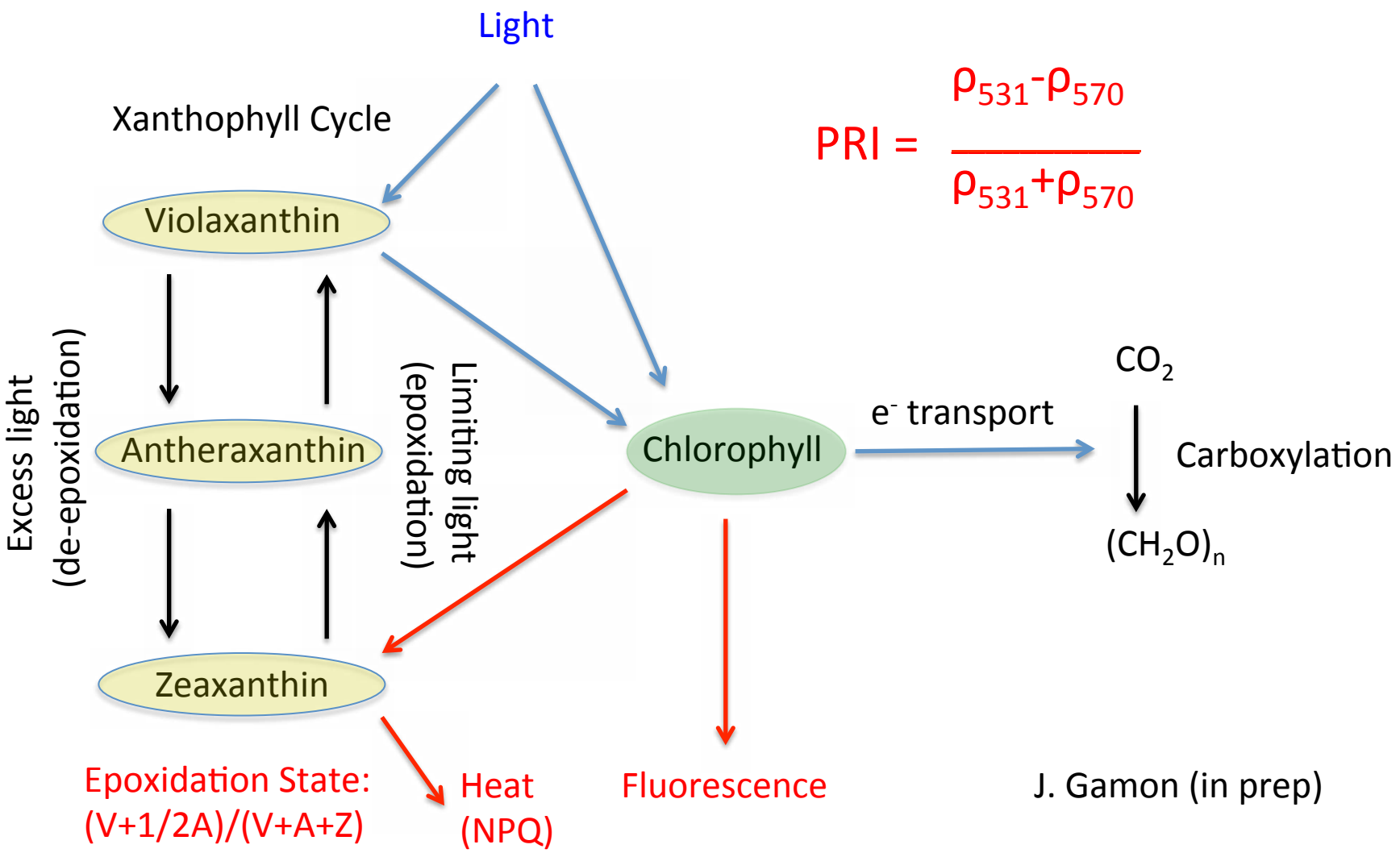
Optical detection of season length & photosynthetic activity in evergreens

John Gamon & Chris Wong
(University of Alberta)





Energy Distribution in a leaf



Leaf & Canopy Reflectance (Pine)

Leaf reflectance sampling

Canopy reflectance sampling

Data slides temporarily removed
For more information, please contact the authors:

John Gamon
Chris Wong

Effects of Spectral Shifts on PRI:

- Seasonal transitions: ΔPRI = 0.30
- Deep cold transitions: ΔPRI $\leq$ 0.10
- Diurnal transition: ΔPRI $\leq$ 0.07

- PRI changes over seasonal time courses are primarily caused by changing pigment pool sizes (not xanthophyll cycle activity).
- These pigment changes provide potent indicators of photosynthetic activation/deactivation.

Implications:

Evergreen vegetation covers large regions of the planet (e.g. boreal forest).

In evergreens, shifting growing season and photosynthetic activity can be assessed with spectral reflectance.

Remote assessment of photosynthesis can improve our knowledge of changing phenology and carbon fluxes.

Pigment pools provide indicators of functional dynamics, optical diversity, and biodiversity.

Thank You!