

2015 WSU Plant Sciences Retreat

Saturday, March 7th, CUE 202 with dinner and poster session, CUE 5th Floor

10:00 am Open poster session, CUE 5th Floor

1:00 pm Welcome and opening remarks: **Dr. Michael Neff**, MPS Program Director

1:15-2:30 Session I: Chair Mark Lange

Dr. Henning Kunz: Photosynthesis under abiotic stress - How to find new strategies to cope with the issue.

Synopsis: During salt stress leaf chloroplasts experience K⁺-loss which results in chlorophyll degradation and poor photosynthetic rates. In my lab we focus on understanding the plastidial ion transport and on identifying the encoding genes of this process. With the newly gained knowledge in hand, we aim to design plants with modified chloroplast ion transporters that are capable to maintain higher photosynthetic efficiency and produce more biomass even under soil salinity conditions.

Dr. Kiwamu Tanaka: The double life of ATP: extracellular nucleotide signaling in plants.

Synopsis: Although ATP is generally considered to be the energy currency molecule in the living cell, ATP also acts as a danger signal for damaged-self recognition in multicellular organisms when it is released into the extracellular space following cellular damage. Extracellular ATP is recognized at the cell surface by purinoceptors to evoke immune responses and healing of damage. Recent research on the extracellular ATP signaling in plants will be introduced.

Dr. Sachin Rustgi: Fighting back the 'gluten syndrome'

Synopsis: The talk is dedicated to our ongoing efforts on the development of a universal dietary therapy for the gluten syndrome by engineering wheat genotypes lacking immunogenic prolamins or expressing 'glutenases'.

Sujith Puthiyaveetil: The secret of the high efficiency of protein repair in chloroplasts.

Synopsis: The secret of the high efficiency of protein repair in chloroplasts.

The photosystem II (PS II) extracts electrons from water to drive the linear electron transport in photosynthesis. PS II undergoes damage in light, which affects photosynthetic efficiency. A highly efficient repair mechanism known as the PS II repair cycle repairs the photodamaged PS II. This repair cycle can turn over the total pool of PS II in less than an hour. A hitherto unappreciated high level of organization and division of labor in the repair machinery, comparable to the assembly line of automobiles, is behind this high efficiency.

Narayanan Srividya: Understanding Product outcome in a Model Monoterpene Synthase and its Mutants.

Synopsis: (4S)-limonene synthase has emerged as a model enzyme for enhancing our comprehension of the cyclization reaction mechanism of monoterpene (C₁₀) synthases to form limonene and other products. Mutations in Limonene synthase reveal specific roles of residues in stabilizing intermediates and product formation, which will be the subject of the talk.

- 2:30-3:00 Break
- 3:00-4:00 Session II: Chair Andrei Smertenko
- James Santiago** Amino Acid Permease 8: The missing link in leaf to seed transport of nitrogen in Arabidopsis
Synopsis: Amino acid transporter AAP8 was found to be expressed in the vascular bundles of Arabidopsis source leaves. Cell-biological, molecular, biochemical and physiological analyses resolved that it plays an essential role in phloem loading of amino acids and in source to sink allocation of nitrogen. AAP8 function strongly affects plant development and productivity.
- Ryan Boyd:** Modeling the limitation of carbonic anhydrase in the C₄ photosynthetic carbon concentrating mechanism
Synopsis: Carbonic anhydrase (CA) provides the HCO₃⁻ substrate to phosphoenolpyruvate carboxylase (PEPc) through the hydration of CO₂ as part of the carbon concentrating mechanism in C₄ photosynthesis. The supply of HCO₃⁻ has been assumed to be non-limiting to PEPc, we present modeling and measured kinetic parameters for both CA and PEPc that suggest CA does limit the activity of PEPc and the C₄ carbon concentrating mechanism.
- Ramanjot Kaur:** Discovery of the ‘most famous wheat gene’, Ph1: light at the end of the tunnel!
Synopsis: Although identified in 1958, we have successfully cloned the Ph1 gene that controls the orderly pairing behavior of wheat by differentiating the related from identical chromosomes thus making it fertile. The multiple copies of the gene underwent polyploid specific changes both at the structure and expression level to evolve its unique function. Cloning of this gene has now opened avenues for its targeted manipulation and how the Ph1 gene functions.
- Aaron Ogden:** Coordination of rhizobial and legume metabolism during the development of symbiotic nitrogen fixation.
Synopsis: Our project uses metabolomic and proteomic tools to explore how legumes and rhizobia coordinate their physiologies during the development of symbiotic nitrogen fixation in indeterminate root nodules. Our results indicate that the proteins in different regions of the nodules can be distinguished and that the symbionts are regulating multiple branches of their metabolism as they differentiate to form an efficient nitrogen-fixing organ.
- 4:00-4:10 Introduction of keynote speaker: **Dr. Michael Neff**, MPS Program Director
- 4:10-5:00 Steve Huber, USDA-ARS Global Change and Photosynthesis Research Unit, University of Illinois
Title: Aligning Aspirations and Opportunities in Plant Science: A Personal Perspective
- 6:00-10:00 Buffet dinner and poster viewing CUE 5th Floor