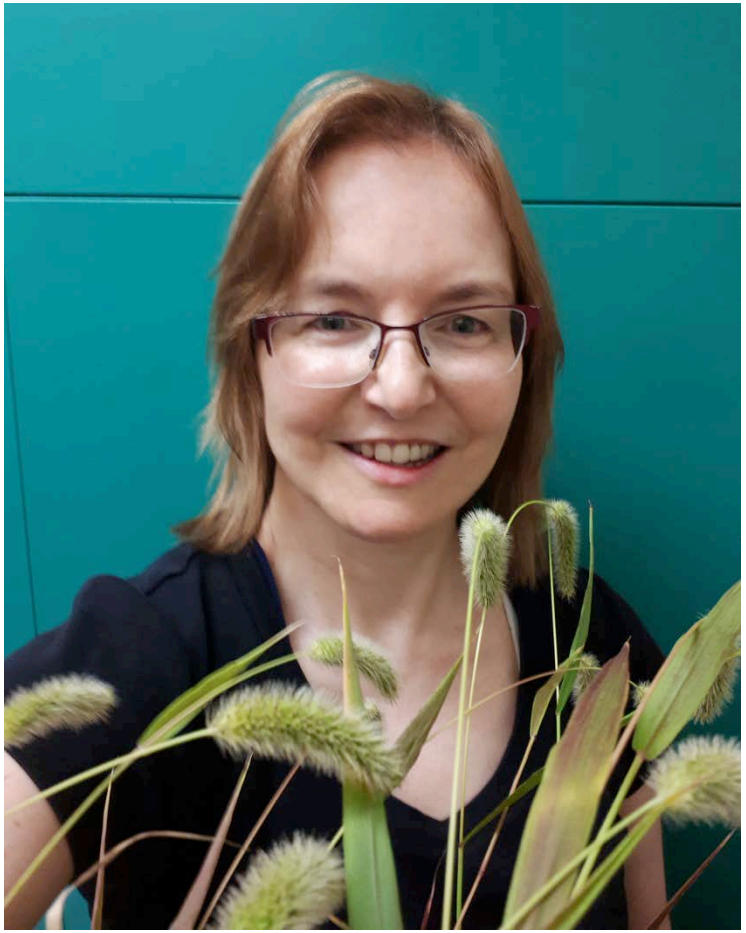
BCIT
BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

# Doing plant science at BCIT: in the field, in the lab, and in the computer

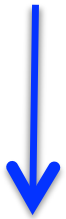


Dr. Carol Wenzel
Biotechnology Department

Dr. David Holloway
Math Department

# Overall research goals

Understand the basic mechanisms underlying plant growth.



Apply this knowledge to manipulate plant growth,
for example to adapt to changing climate conditions.

# Focus 1: Norway spruce development

## A. Control of needle production

Vegetative bud
containing a shoot apex

Outgrowth of needles
during bud flush

# Focus 1: Norway spruce development

## B. Control of stem growth

Vegetative shoot apex

Outgrowth of needles & stem elongation during flush

Fully elongated branch

# Focus 1: Norway spruce development

## C. Control of shoot apex identity

Immature
shoot apex
(uncommitted)

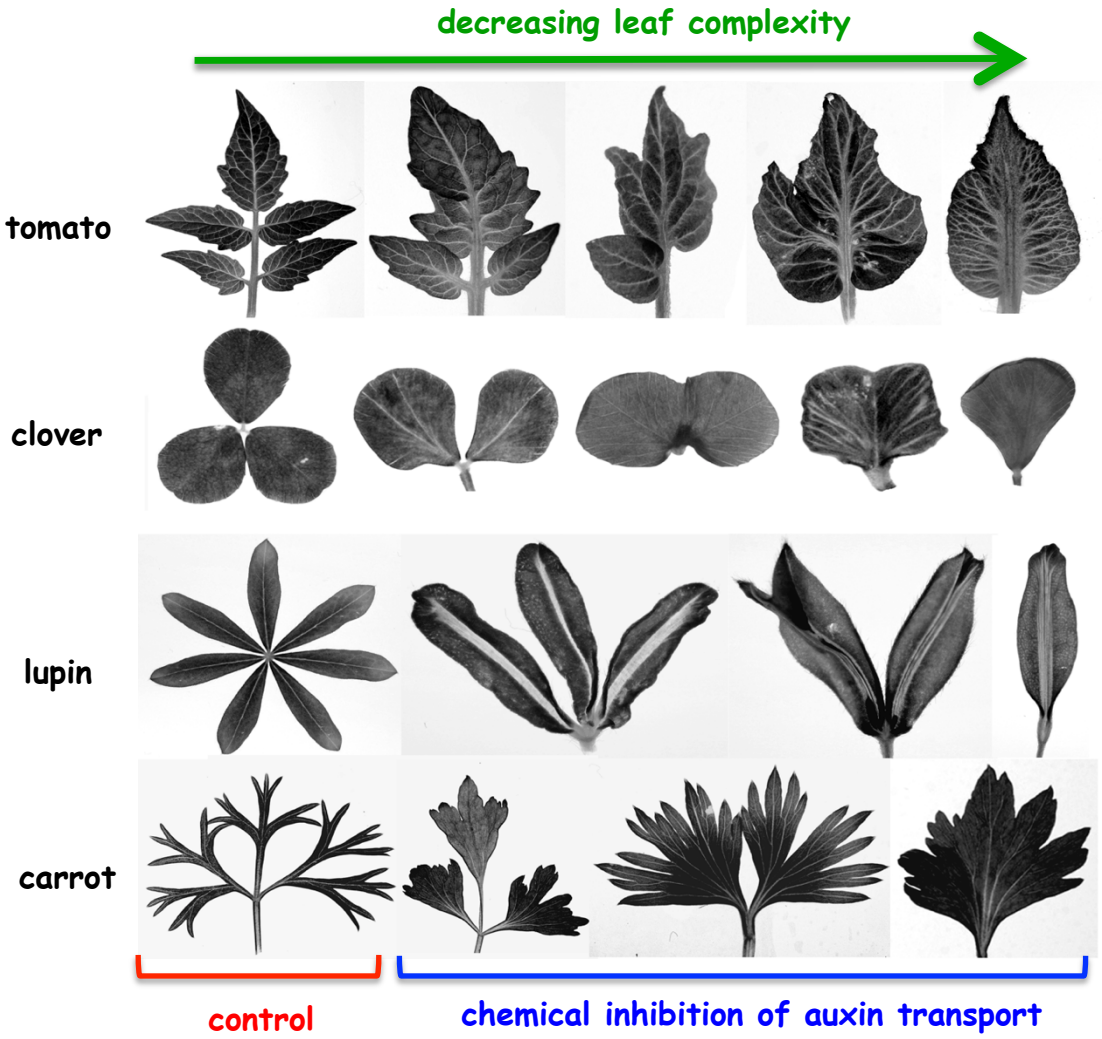
More mature shoot apex
Vegetative (left)
Male cone (right)

Vegetative
(needles and stem)

Reproductive
(male cone)

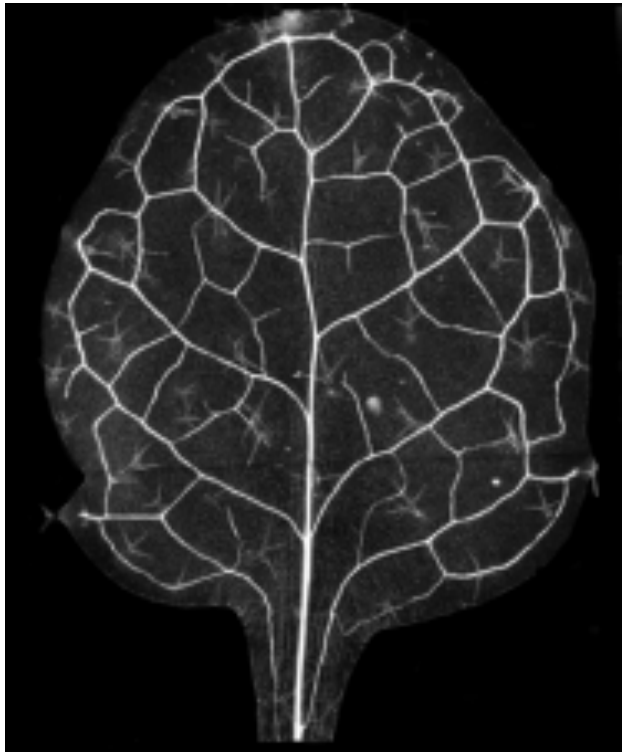
# Focus 2: Leaf and vein development

## A. Auxin transport control of leaf shape

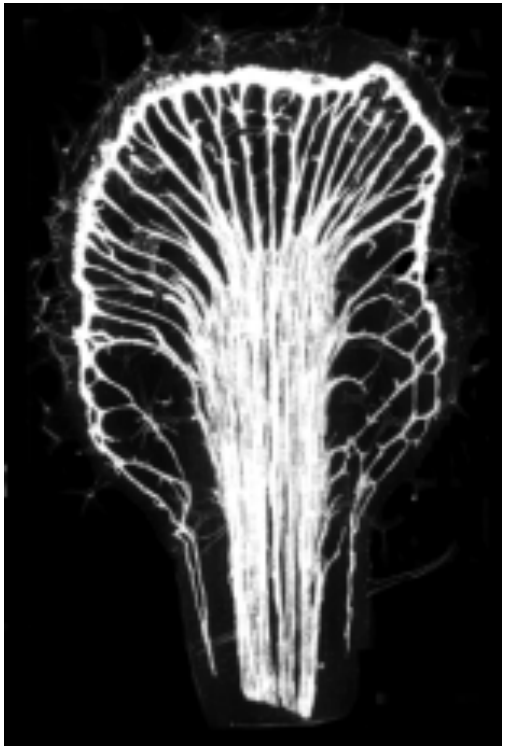


# Focus 2: Leaf and vein development

## B. Auxin transport control of vein patterning



Control

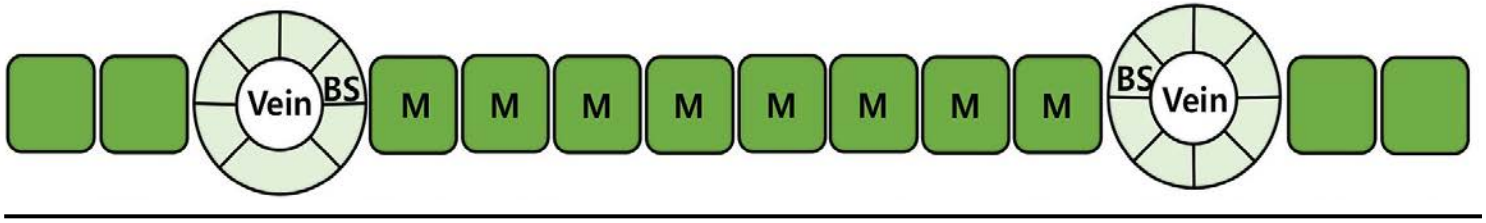


Auxin transport inhibited

# Focus 2: Leaf and vein development

## C. Role of auxin in $C_3$ versus $C_4$ vein patterning

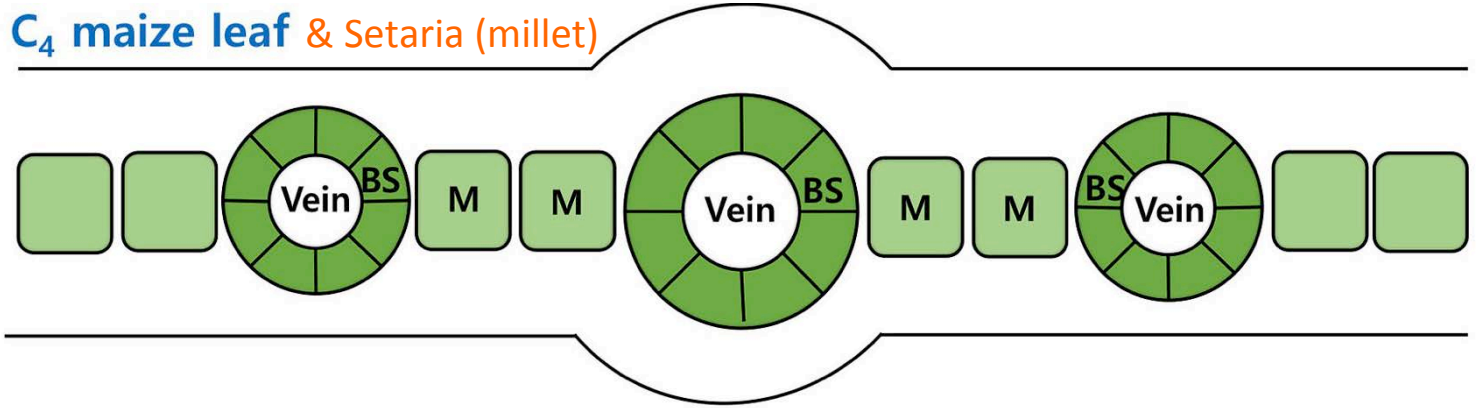
**$C_3$ rice leaf**




Increase vein density

Convert $C_3$ plants like wheat and rice
Into $C_4$ type photosynthesis
(confers more drought tolerance)

**$C_4$ maize leaf** & Setaria (millet)



# Funding for projects

BCIT IRF grant to Carol Wenzel

NSERC Discovery grant to David Holloway
&
NSERC USRAs to BCIT/UBC co-op students

Plantae Conviron award to Horton Lai and Carol Wenzel for plant growth chamber

# Student research projects

- Summer student research projects
  - 17 BCIT/UBC Honors Biotechnology undergraduate co-op students
  - 1 University of Toronto undergraduate Chemistry student

- BCIT Biotechnology students in plant biotech courses
  - Example: Plant transformation and selection

- Collaborators
  - Dr. Jim Mattsson (Biology, SFU)
  - Dr. Patrick von Arderkas (Biology, UVic)