The Laboratory of Tree-Ring Research

presents a talk by

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What can we learn from the arctic shrub (-rings)? Dendrochronological records of shrubs' annual growth in High and Low Arctic sites (Spitsbergen, Greenland, Alaska)

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Room: Bannister 424

Recent changes in the thermal regime of the Arctic and related tundra expansion in higher latitudes resulted in an intense development of dendrochronological and dendroecological studies in the polar regions. In last decade we observed a significant increase in the use of tree-ring growth analysis in high latitudes where radial growth of woody plants, from shrubs to perennial herbs, is studied. Thermal limitations of cambial growth in the Arctic enable mainly dendroclimatological studies, which application requires a construction of reliable tree-ring chronologies. Dendrochronological studies of tundra shrubs growing on the limit of woody plants survival is very challenging and requires multistep cross-dating.The study presents one of the narrowest annual growth rates of woody plants ever studied (i.e., less than a 50 microns of annual radial growth at the root collar base). The collection includes the species from central Spitsbergen (i.e., 78°N: Salix polaris, Dryas octopetala), Western and Eastern Greenland (Betula nana, Salix arctica, Juniperus nana) and Northern Alaska (Betula nana). The study discussed the methodological problems and limitations of dendrochronological applications in the Arctic. The challenges of dwarf shrubs growth studies is discussed in the light of their common irregular growth, expressed in high ratio of missing and wedging rings.The examples of shrubs dendrochronological studies emphasized the need of serial sectioning which needs to be perform within both above- and below-ground plant parts. This procedure allows for a complete cross-dating and a detection of irregular radial growth, as well bring us closer to understand a complex growth allocation strategies in the arctic woody plants. Radial growth measurements are supplemented with an explorative quantitative wood anatomical analyses of dwarf shrubs at the annual growth rings resolution.

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