

# DANDRITE/PROMEMO Topical Seminar

## In utero nano-injection to generate new mouse models and lineage trace fates across organ systems

Major advances in genomics and transcriptomics have rapidly advanced our knowledge into genes and mechanisms that may be controlling aspects of health and disease. However, in vivo validation has lagged behind. To address this, we adapted in utero nano-injection to target and manipulate gene expression in embryonic tissues during or after gastrulation. One iteration of the technique, which we dubbed NEPTUNE (neural plate targeting by in utero nano-injection) rapidly and flexibly transduces the neural plate with virus prior to neurulation, and can thus manipulate the future nervous system. Stable integration in >95% of cells in the brain enabled long-term over-expression, and conditional expression can be achieved using cell-type specific promoters. In the absence of conditional expression, this method broadly targets ectodermal derivatives including epidermis and neural crest, as well as ectodermal placode-derive organs such as the eye and inner ear. The method can recapitulate established mouse knockouts, and revealed a novel function of Sptbn2, mutations in which are associated with Spinocerebellar ataxia type 5. Now, using in utero delivery of a viral barcode library, we are leveraging NEPTUNE and adaptations thereof to perform single cell lineage tracing of cells from E7.5 onwards.

**Host:** Alena Salasova



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**Date:** Tuesday 20 February 2024  
**Time:** 14:00 – 15:00  
**Venue:** 1231 - 114  
**Address:** Wilhelm Meyers Allé 3  
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**OPEN TO ALL INTERESTED!**