

21 February 2025

Friday

10 am

TLL Auditorium (Level 1)

Hosted by:

**Dr Ramachandran  
Srinivasan**

**ALL ARE WELCOME**



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Prof. Sundaresan did his Ph.D. at Harvard, and postdoctoral research at UC Berkeley. His previous positions include PI at Cold Spring Harbor Laboratory, and Director of IMA, Singapore. He is currently Distinguished Professor at UC Davis. He has been elected to the National Academy of Sciences USA and awarded the 2024 Wolf Prize in Agriculture.

## Professor Venkatesan Sundaresan

Distinguished Professor, Plant Biology & Plant Sciences  
University of California-Davis

### Gametes to Zygotes to Self-Cloning plants

For both plants and animals, the transition of a fertilized egg cell into a zygote is a critical step in sexual reproduction. In animals, early embryonic divisions rely on maternally provided gene products. Using a rice model, zygotic genome activation in plants is shown to occur before the first embryonic division. Transcription factors expressed by the paternal genome trigger the zygotic transition. The maternal alleles are silenced, thereby imposing a fertilization requirement for embryogenesis. Manipulation of the corresponding genes in eggs bypasses fertilization, resulting in parthenogenesis. When combined with editing of meiosis genes, plants that reproduce stably as genetic clones can be generated. With these gene alterations, hybrid rice propagated through seeds maintains uniform hybrid vigour in subsequent generations. Fixation of hybrid vigour in crop plants has broad implications for the availability of high-yielding hybrid seeds at low cost to subsistence farmers.

#### Recent Publications:

1. Ren, H., Shankle, K., Cho, M.-J., Tjahjadi, M., Khanday, I., Sundaresan, V. 2024. Synergistic induction of fertilization-independent embryogenesis in rice egg cells by paternal-genome-expressed transcription factors. *Nature Plants* 10:1892-1899 [www.nature.com/articles/s41477-024-01848-z](https://www.nature.com/articles/s41477-024-01848-z)
2. Vernet, A., Meynard, D., Lian, Q., Mieulet, D., Gibert, O., Bissah, M., Rivallan, R., Autran, D., Leblanc, O., Meunier, A., Frouin, J., Taillebois, J., Shankle, K., Khanday, I., Mercier, R., Sundaresan, V., Guiderdoni, E. 2022. High-frequency synthetic apomixis in hybrid rice. *Nature Communications* 13: 7963 doi.org/10.1038/s41467-022-35679-3
3. Khanday, I., Skinner, D., Yang, B., Mercier, R., Sundaresan, V. 2019. A male-expressed rice embryogenic trigger redirected for asexual propagation through seeds. *Nature* 565: 91-95 DOI:doi.org/10.1038/s41586-018-0785-8