Advanced Discrete Event Simulation in R

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Disclosures

- We have no financial or other conflicts to declare
- Supported by the NCI CISNET Incubator and CISNET programs:
  - All by U01 CA265750-02 (CISNET bladder cancer)
  - Alarid-Escudero also by U01 CA265729 (CISNET gastric cancer); and U01 CA253913 (colorectal cancer)
- Trikalinos and Sereda developed and maintain the **nhppp** R package

Tuesday 17th of December, 2024

Time	Description	Discussant
[10 min]	(0) Introductions and administrivia	Trikalinos
[20 min]	(1) DES as a composition of point processes	Trikalinos
[25 min]	(2) NHPPPs – key properties	Trikalinos
[25 min]	(3) Sampling from NHPPPs	Trikalinos
[40 min]	(4) Guided code review - Implement a simple cancer natural history DES for one person - The many-person case - Packaging	Trikalinos
[15 min]	General Q & A	Trikalinos

For the code review / hands-on part

- You need R, preferably with an IDE such as R Studio.
- Install packages `data.table` and `nhppp (>=1.0.0)`.
  To install them from CRAN,

```
> install.packages("data.table")
> install.packages("nhppp")
```

- All materials are available at
  - Through the Dropbox link in the email through 17/01/2025.
    Password "**smdm_boston**",
  - https://github.com/ttrikalin/des-R-course
    (`2024_columbia` release)

Learning objectives

Be able to discuss:

- How a basic DES is organized
- Three properties of NHPPPs (memorylessness, composability, and transmutation by transforming the time axis) that are important for simulation
- Sampling algorithms and their use via `R`'s **nhppp** package