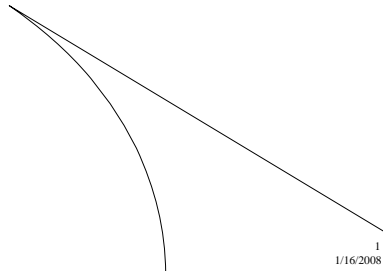


# TreeAge Pro 2008 Product Overview

TreeAge Software, Inc.



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1/16/2008

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## Overview

- TreeAge Pro 2008 introduces new features and improves existing ones
- Each new/enhanced feature is highlighted in this webinar
- Also see Technote 11 for release notes

<http://www.treeage.com/files/pdfs/pro2008/technote11.pdf>

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## New Features

- Tree Workbook
- New Microsimulation Keywords
- New Functions
- Monte Carlo Special Variables
- Monte Carlo EVPPI Seed

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## New Features

- Parallel Trials
  - Dynamic Parallel Trials
  - Parallel Trials/Discrete Event Simulation (\_clock)
  - Parallel Trials/Sets
- Document Locking & Properties

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## Enhanced Features

- Markov Cohort Output
- Debugging Output
- Analysis Speed
- User Defined Python Functions

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## TreeAge Pro 2008

### New Features

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## Tree Workbook

- Requires the Excel Module
- Export data from a tree into a set of Excel worksheets (variables at root, tables, distributions)
- Update data in Excel and send it back to the tree in TreeAge Pro
- Save multiple Tree Workbooks for the same tree to store different sets of data for that tree

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## Tree Workbook

- Run C/E analysis and Monte Carlo simulations from Excel
  - Limited analysis options
- Import C/E output directly into Excel
- Import statistics report and/or text report from Monte Carlo output into Excel

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## Tree Workbook

- Note:
  - Functions access the first instance of the TreeAge Pro and Excel applications
  - It is recommended that you open only one instance of each application before using this feature

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## Tree Workbook

- Demo: TreeWorkbookExample.pkg
  - From Excel menu...
    - TreeAge > Create Tree Workbook
    - Review worksheet tabs
  - Update a variable
  - Update a table
  - Run a MC simulation
  - Import MC stats and text report

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## New Microsimulation Keywords

- New keywords can now be used in expressions (variables, rewards, probabilities, etc.) during microsimulation
- Existing:
  - \_trial, \_sample
- New:
  - \_voi\_sample, \_trial\_size, \_sample\_size, \_voi\_sample\_size, \_state\_index, \_thread\_index, \_cache\_level, \_parallel\_trial\_creator, \_parallel\_trials\_clock, \_parallel\_trials\_set, \_parallel\_trials\_sets\_size
- Keywords will be described in detail in the TreeAge Pro 2008 manual

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## New Functions

- GlobalNIncr, GlobalIncr
  - Increment the current global matrix value and return the new value
- TrackerIncr (Healthcare Module)
  - Increments a tracker variable

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## New Functions

- StateIndex (Healthcare Module)
  - Returns the integer index of the named state
  - Useful with StateProb  
(which requires the index)
- TransProb (Healthcare Module)
  - Returns the product of path probabilities from Markov node to current node
  - $\text{TransProb} * \text{StateProb} = \text{proportion of cohort at that transition}$

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## New Functions

- All functions are available via Function Helper
- Demo to follow
  - Combined with Monte Carlo Special Variables



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## Monte Carlo Special Variables

- Special variables allow you to run actions/calculations either before or after each iteration
  - `_monte_pre_trial_eval` (microsimulation)
  - `_monte_post_trial_eval` (microsimulation)
  - `_monte_pre_sample_eval` (sampling)
  - `_monte_post_sample_eval` (sampling)
  - `_monte_pre_info_sample_eval` (EVPPI)
  - `_monte_post_info_sample_eval` (EVPPI)

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## New Functions/ Monte Carlo Special Variables

- Demo: MarkovNewFunctions.tr
- Examine each function call
  - {T} t\_GlobalNIncr = GlobalNIncr(1; \_trial; 2) + 0\*GlobalN(1; \_trial; 1; \_trial)
    - Store the \_trial counter in col. 1 of the matrix
    - Increment the value in col. 2 of the matrix
  - {T} t\_StateIndex = StateIndex("Alive")
    - Set the tracker value to the index number for state "Alive"

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## New Functions/ Monte Carlo Special Variables

- Demo: MarkovNewFunctions.tr
- Examine each function call (continued)
  - {T} t\_TrackerIncrAll = TrackerIncr("t\_TrackerIncr1"; 1) + TrackerIncr("t\_TrackerIncr2"; 2) + TrackerIncr("t\_TrackerIncr3"; 3)
    - Increment the three trackers by 1, 2 and 3 respectively
  - \_node\_action = Command("Excel"; "ExportGlobalMatrixN"; 1)
    - Export global matrix to Excel upon toolbar click 

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## New Functions/ Monte Carlo Special Variables

- Demo: MarkovNewFunctions.tr
- Examine definitions for special variables
  - \_monte\_pre\_trial\_eval = GlobalN(1; \_trial; 3; t\_GlobalNIncr\*100)
    - Before each trial, set col. 3 of the matrix to 100 \* t\_GlobalNIncr
  - \_monte\_post\_trial\_eval = GlobalN(1; \_trial; 4; t\_GlobalNIncr\*100)
    - After each trial, set col. 4 of the matrix to 100 \* t\_GlobalNIncr

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## New Functions/ Monte Carlo Special Variables

- Demo: MarkovNewFunctions.tre
  - Run simulation and examine Text Report
    - t\_GlobalNIncr was incremented each “Alive” cycle
    - t\_StateIndex set to the index for state “Alive”
    - t\_TrackerIncr1, 2, 3 were each incremented by 1, 2, 3 respectively for each “Alive” cycle

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## New Functions/ Monte Carlo Special Variables

- Demo: MarkovNewFunctions.tre
  - Export global matrix 1 to Excel via \_node\_action and examine data
    - GlobalNIncr incremented col. 2 for every “Alive” cycle
    - Pre trial action placed 0 in col. 3 because tracker is not set before trial begins processing
    - Post trial action placed 100 times final tracker value in col. 4

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## Monte Carlo EVPPI Seed

- New advanced seeding option for Partial EVPI Monte Carlo simulations
- Partial EVPI Monte Carlo simulations function like this
  - Sample distribution subset in outer loop
  - Sample remaining distributions in inner loop
  - Trials run within remaining distributions loop

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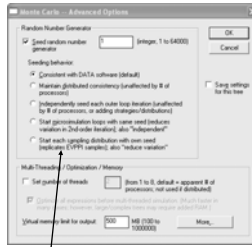
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## Monte Carlo EVPPI Seed

- Last seeding option is new
  - Provides for consistency in distribution sampling
  - Move individual distributions to and from the outer loop subset without changing the values sampled



Start each sampling distribution with own seed (replicates EVPPI samples); also "reduce variation"

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## Dynamic Parallel Trials

- Microsimulation now allows for a dynamic number of trials
- Use non-coherent, integer probabilities to add trials to the analysis
  - Non-coherent probabilities that add trials must be integers
  - Can't add 0.5 trials

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## Dynamic Parallel Trials

- Demo: DynamicParallelTrials.tre
  - Tree preference (Category Other Calc Settings)
    - Allow non-coherent probabilities
  - Examine "Add trials" state
    - Adds new healthy and sick trials with each cycle
  - Examine tracker modifications
    - Use Global matrix to store each trial's state at each cycle
    - Death tracked in transition because tracker modification at absorbing state is ignored

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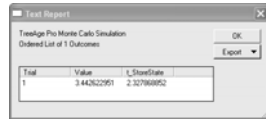
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## Dynamic Parallel Trials

- Demo: DynamicParallelTrials.tre
  - Run microsimulation
  - Examine Text Report
    - Shows average years lived across trials based on simulation option

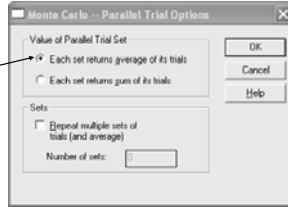


Text Report

TranSage Pro Monte Carlo Simulation  
Ordered List of 1 DataRows

Trial	Value	StateDate
1	3.44322951	2.327898952

OK Export



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1/16/2008

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## Dynamic Parallel Trials

- Demo: DynamicParallelTrials.tre
  - Examine Global Matrix via `_node_option`
    - Shows the state for each trial at each state
    - Trial 1 returns to the “Add trials” state each cycle
    - New trials come in with each stage
      - No state (0) until the trial is added in healthy (2) or sick (3) state
    - Existing trials get sick and/or die
      - Once trial is added, see transitions

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## Parallel Trials/ Discrete Event Simulation (`_clock`)

- Parallel trials requires that trials are synchronized based on time
- In Discrete Event Simulation, cycles may have different time lengths
  - Cannot rely on `_stage` to keep trials synchronized
- The new tracker `_clock` is used to synchronize the timing of trials
- The trial with the lowest `_clock` value will pass through the model next

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## Parallel Trials/ Discrete Event Simulation (`_clock`)

- Demo: `ParallelTrials_clock.tre`
  - Each trial stays within the same state, but for a different amount of time
  - Examine how `_clock` is incremented differently for each state

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1/16/2008

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## Parallel Trials/ Discrete Event Simulation (`_clock`)

- Demo: `ParallelTrials_clock.tre`
  - Global matrix updates for each `_trial` at each `_stage`
    - Columns show passage of time by cycle
    - Trial/state 1 stores its state in Global row 1
    - Trial/state 2 stores its state in Global row 2
    - Trial/state 3 stores its state in Global row 3
    - Stage stored in Global row 4
    - `_clock` stored in Global row 5

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## Parallel Trials/ Discrete Event Simulation (`_clock`)

- Demo: `ParallelTrials_clock.tre`
  - Run microsimulation
  - Examine Global Matrix via `_node_option`
    - Note sequence of processing of each trial by `_clock`
    - Trial 1 is processed for every increment of `_clock` (not every stage)
    - Trial 2 is processed every 2 increments of `_clock`
    - Trial 3 is processed every 3 increments of `_clock`

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## Parallel Trials/Sets

- Some models will yield highly variable results when running parallel trials
- It may require several “populations” to stabilize the parallel trials results to generate an expected value
- Sets of trials generate results for several “populations”, from which the mean can better approximate the expected value

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## Parallel Trials/Sets

- The “Parallel Trials Option” button opens a dialog to...
  - Indicate whether to calculate sums or averages for the trials within a set of trials
  - Allows you to run more than a single set (the default)
- Demo: DynamicParallelTrials.tre
  - Run simulation with multiple sets
  - Row in Text Report for each set of trials rather than for each trial itself

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## Document Locking & Properties

- Document locking
  - Lock document to prevent inadvertent changes.
  - From menu...
    - Select Options > Lock Against Changes
  - From keyboard...
    - Ctrl-L
  - Not password protected

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## Document Locking & Properties

- Document Properties
  - Edit document description and creator in the properties grid

Name	Value
Name	Markov
+ Tracker Defaults	
+ Table Files	
- Document Properties	
Description	
Creator	
Freeze model (lock ... on	

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## TreeAge Pro 2008

### Enhanced Features

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## Markov Cohort Output

- Requires the Healthcare module
- Output expanded to include columns for extra payoffs
  - If tree property set to calculate extra payoffs
  - Can also be output through Object Interface
- Demo: MarkovCohortOutput-Payoffs.tre
  - Note tree properties
  - Note payoff 2 state rewards
  - Note extra columns in Markov cohort output

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## Debugging Output

- For most errors, show calculation being performed before error
  - Even if tree properties indicate that only errors/warnings should be displayed
- Demo: DebugOutput.tre
  - Run rollback and see debug info
  - “Error Expression” text added above “Parser Error” text

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## Analysis Speed

- Analyses for many simulations now run 5-10% faster than TreeAge Pro 2007
- This is on top of the 15-20% increase introduced by TreeAge Pro 2007

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## User Defined Python Functions

- Enhanced to allow access to...
  - Global matrices
  - Debug output window
  - Parallel trials information
- Demo: PythonGlobalDebug.tre
  - Examine tree preference for debug
  - Get Expected Value at root node
  - Review debug output
  - Run \_node\_action from toolbar
  - Review global matrix in Excel

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## Summary

- Questions?



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## Webinar Feedback & Materials

- Please provide feedback
  - Via GoToMeeting survey
- Materials available by EOD at
  - <http://server.treeage.com/treeagepro/training/webinars.asp>

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