



ZMT zurich med tech

TI Solutions

## 版本更新: Sim4Life V9.4 桌面版



[https://zmt.swiss/assets/downloads/Sim4Life/linked\\_download/9-4/releasenotes.txt](https://zmt.swiss/assets/downloads/Sim4Life/linked_download/9-4/releasenotes.txt)



## Sim4Life V9.4 桌面版更新亮點

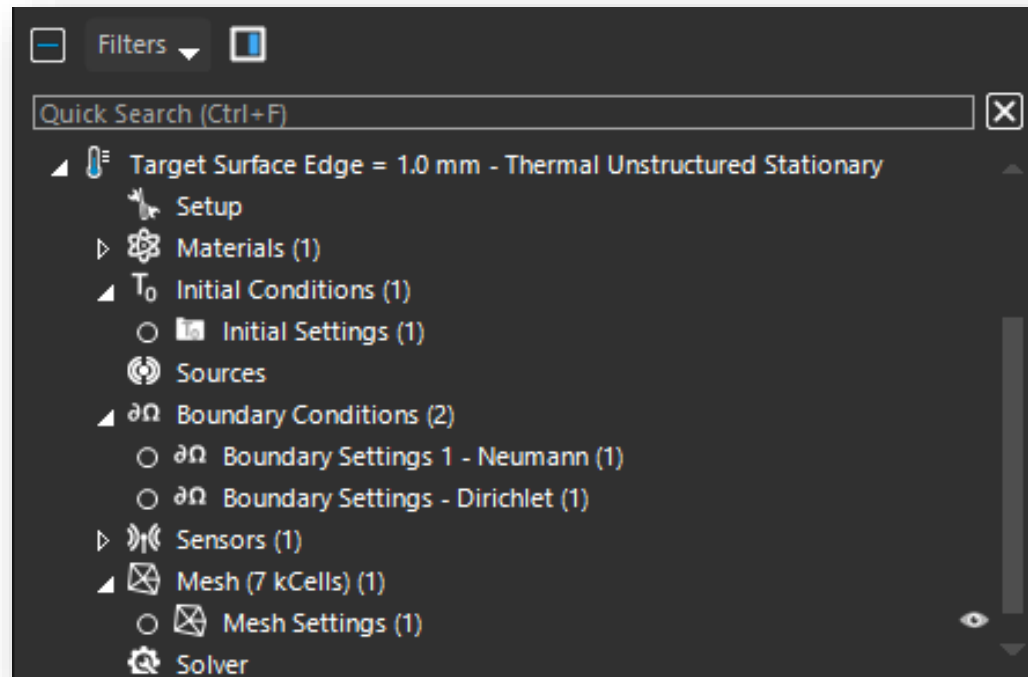
- **增強穩定性、效能與品質:** 針對複雜且大規模的模型，顯著提升了系統的強健性與運算效能
- **熱非結構化穩態求解器(Thermal Unstructured Stationary Solver):** 新增的求解器支援非結構化網格，能精確計算複雜幾何結構中的穩態溫度分佈
- **圖形介面(GUI)與 Python 工作流的高度整合:** 透過更清晰的 API 架構與易於查閱的開發文件，提供更完善的支援，協助進行大規模的自動化腳本研究
- **全新改版的說明手冊與 Python API 參考文件:** 重新構建的文件系統提升了瀏覽體驗，並強化了搜尋功能，讓資訊檢索更準確



# 模擬設置

## (1) 熱非結構化穩態求解器(Thermal Unstructured Stationary Solver)

- 全新的求解器支援使用「非結構化網格」計算複雜幾何形狀中的穩態溫度分佈，能在達到熱平衡後確定溫度場
- 適用於不規則形狀，可透過靈活的網格劃分(meshing)提升準確度，且僅需計算最終穩定的熱狀態
- 支援與矩形網格求解器類似的多端口配置，允許在同一個模擬中定義多個熱源輸入



# 模擬設置

## (2) 溫升熱瞬態模擬(T-increase Thermal Transient Simulation)

- T-increase Thermal Transient Simulation 選項能讓用戶能專注於「溫升」而非「絕對溫度」的簡化模擬，進而提升運算效率與準確度

### 2.9.3.12 T-Increase Thermal Transient Simulation

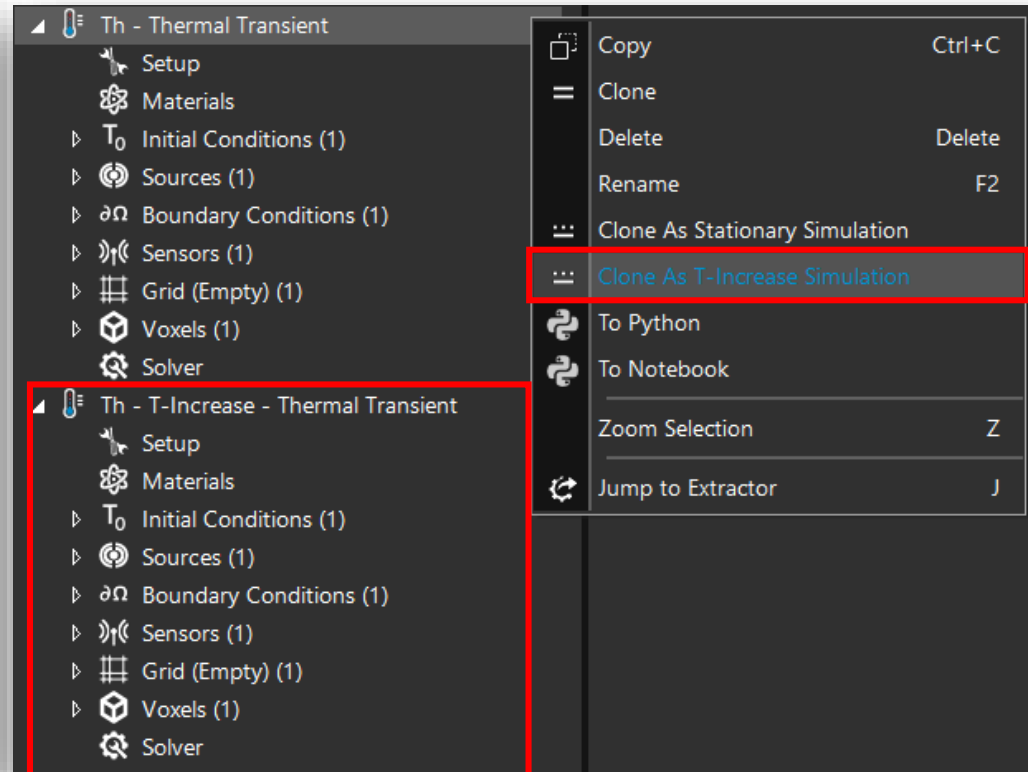
If the primary objective is to analyze the temperature rise rather than the absolute temperature, further simplifications can be applied to the Pennes bioheat equation.

Under the assumption of a linear perfusion rate—which is valid for small temperature increases—the equation can be simplified by removing constant terms, as follows:

- Subtract the base temperature (i.e., the equilibrium temperature without any heat source) from the final temperature to obtain only the temperature difference.
- Perfusion, metabolic heat generation, and ambient blood temperature can be neglected.
- The remaining terms in the equation represent contributions from heat conduction and external sources only.

This method offers significant advantages in numerical accuracy, as the computation is centered around 0°C rather than, for example, 37°C. It also reduces uncertainty and sensitivity related to assumed constants.

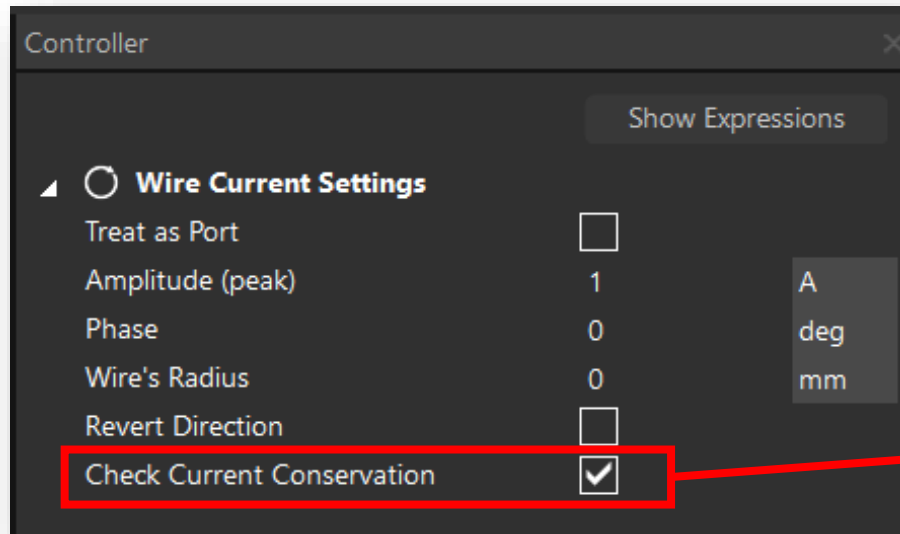
To do a temperature rise simulation right click on the thermal simulation and *Clone As Tincrease Simulation*.



## 模擬設置

### (3) 磁靜態向量位求解器

- 在使用磁靜態向量位(Magneto-Static Vector-Potential)求解器時，若電流迴路是**使用 PEC (完美電導體)**而非線單元迴路來閉合，則可以透過源設定中的勾選框手動**停用電流守恆檢查**



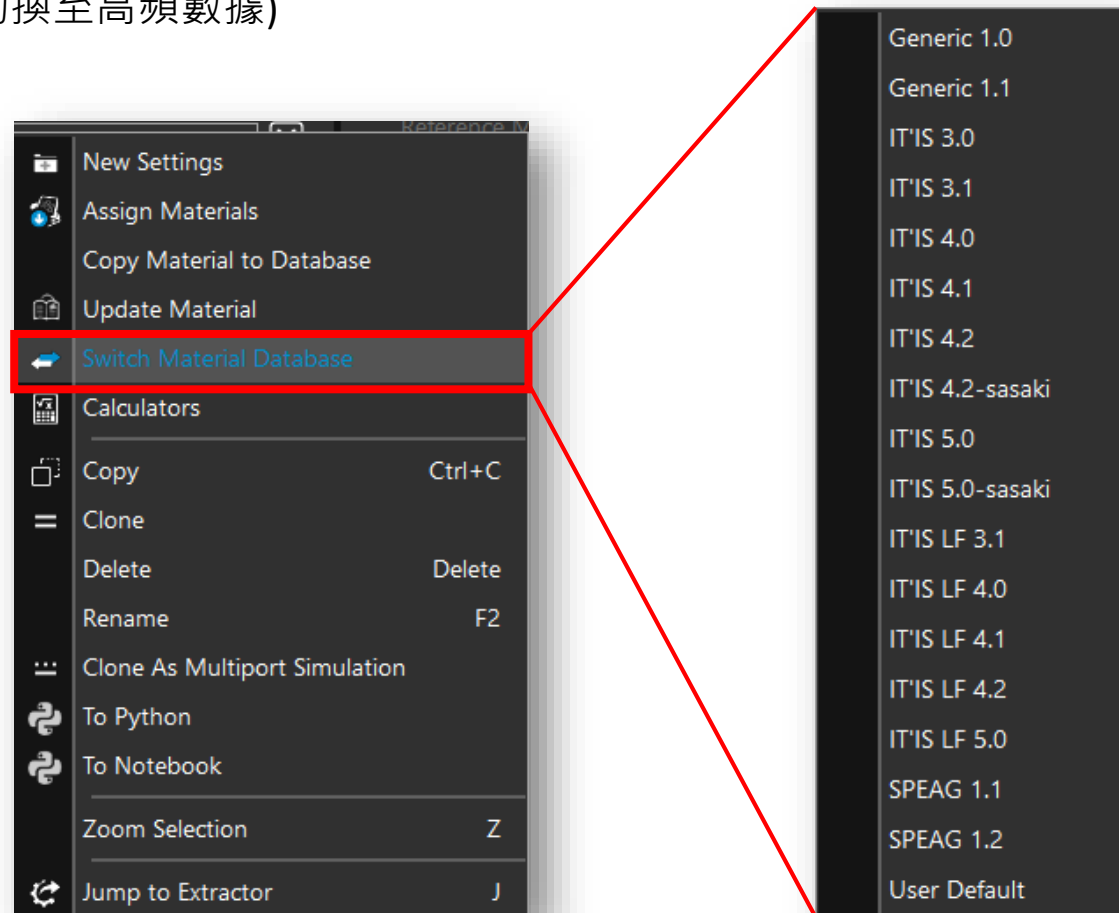
#### Check Current Conservation

Current conservation is essential for the convergence of the magneto static vector potential solver. If the open current lines are connected to a closing PEC structure, this option can be safely turned off.

## 模擬設置

### (4) 切換材料資料庫 (Switch Material Database)

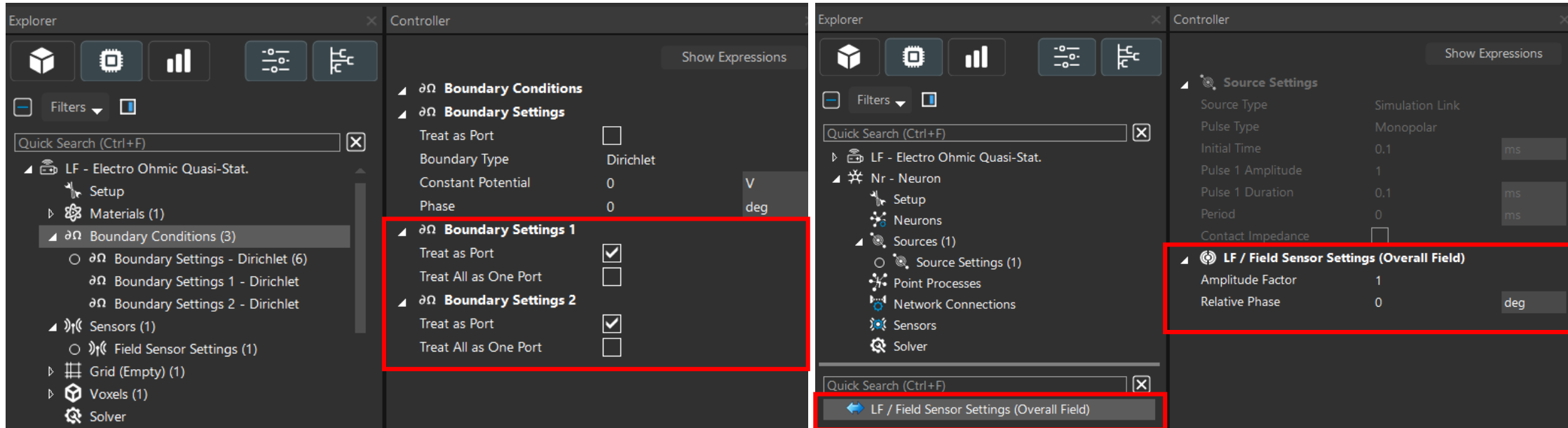
- Switch Material Database 功能選項可讓用戶更換已配置的材料資料庫，例如: 使用舊版資料庫，或是修正先前選錯的類型(如從低頻數據切換至高頻數據)



## 模擬設置

### (5) 多端口低頻求解器與神經元求解器耦合

- 透過將 EM LF 多端口模擬的「場感測器設定」拖放至 Neuron 模擬的「源設定」中，即可為 EM LF 多端口模擬的每個端口指派幅度與相位
- Neuron 模擬中用作源的靜電場將被計算為各端口電場的疊加，每個電場的權重皆依據其指定的電壓振幅與相位而定



# 模擬設置

## (6) 支援 NVIDIA Blackwell 架構 GPU

- Acceleware 核心現已支援 NVIDIA Blackwell GPU 架構，此更新確保在 Acceleware 核心上運行的工作負載能與 NVIDIA 下一代 GPU 硬體完全相容

- NVIDIA Blackwell architectures
  - GeForce RTX 50 series
  - Workstation RTX PRO series
  - Datacenter series



**NVIDIA Blackwell 架構**

AI 推論技術當道，而幕後驅動 AI 工廠的引擎現已全面投入生產。

[閱讀技術概要](#)

簡介 技術突破 產品 技術簡介

The image shows a promotional graphic for NVIDIA Blackwell architecture. It features a large, glowing GPU chip in the center, surrounded by a dark, futuristic background with circuit-like patterns. The text is in white and green, providing information about the architecture and a link to read more.

# Python 支援文件與介面

## (1) 全新文件系統

- 使用手冊與 Python API 參考文件已採用全新的文件框架完全重構，大幅提升了瀏覽體驗與搜尋功能

The image displays two side-by-side screenshots of web-based documentation interfaces.

The left screenshot shows the "Sim4Life Desktop Documentation" page. The header includes a navigation menu with "1 Introduction", "2 Manual", and "3 Tutorials". The main content area is titled "1.1 Introduction to Sim4Life" and contains a "Welcome to Sim4Life!" section. Below this, there are two paragraphs of introductory text and a bulleted list of features: "device design (over-the-air performance, communication links, electrical safety, etc.)", "anatomy dependency across all age groups, from newborns to the elderly (handheld and body-mounted devices, radiofrequency implants, etc.)", and "physiological responses for optimization of effectiveness and safety (neurostimulation, ultrasound, thermal, flow, etc.)". A final paragraph states: "The desktop and web versions are identical twins. This ensures seamless compatibility, exceptional responsiveness, and a unified user experience. Users can easily switch between platforms for an uninterrupted, smooth workflow."

The right screenshot shows the "Sim4Life Python Environment" API Browser. The header includes a search bar and a "Search" button. The main content area is titled "mod document" and "s4l document API". Below this, there is a description: "A singleton representing a document in the s4l application" and "Copyright ZMT, Zurich - Switzerland". The "Functions:" section lists several methods with their descriptions:
 

- ArchivingOptions** – Creates archiving options
- Close** – Close the current document without saving and creates a new untitled document
- CreateArchive** – Create an archive of the current document
- New** – Close the current document (if any) and opens a new empty document
- NewDocument** – Close the current document (if any) and opens a new empty document
- Open** – Open a project file (.smash) and loads all its content into the document
- Save** – Saves the document to the previously given path
- SaveAs** – Saves the document to a given file path
- SaveCopyAs** – Save the document to a given file path
- SaveDocument** – Saves the document to the previously given path
- SaveDocumentAs** – Saves the document to a given file path

 The "Attributes:" section lists:
 

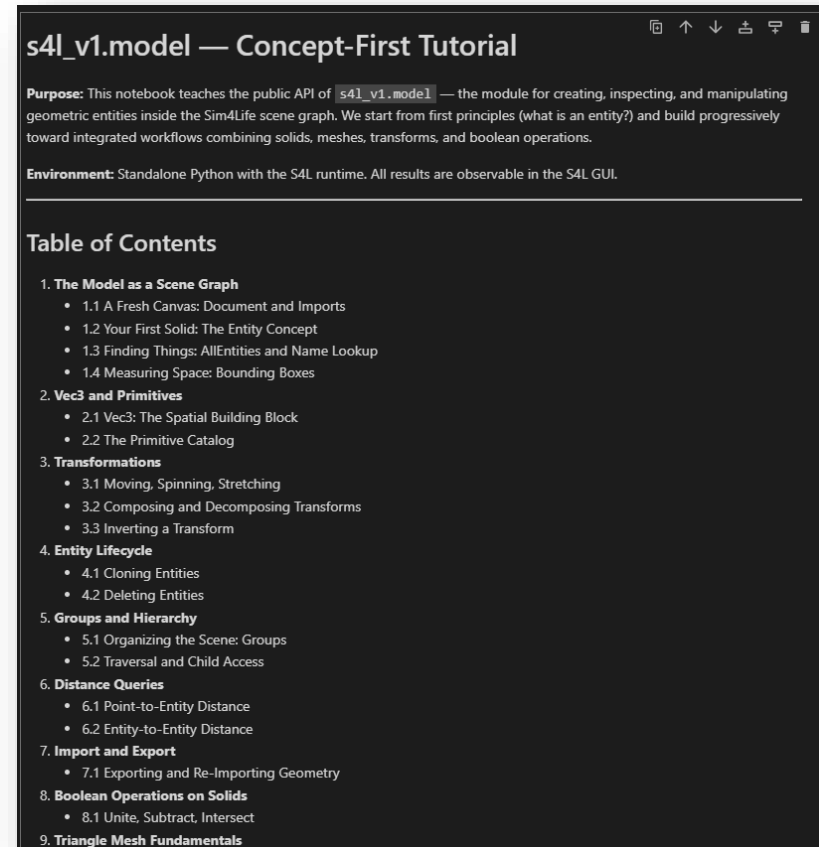
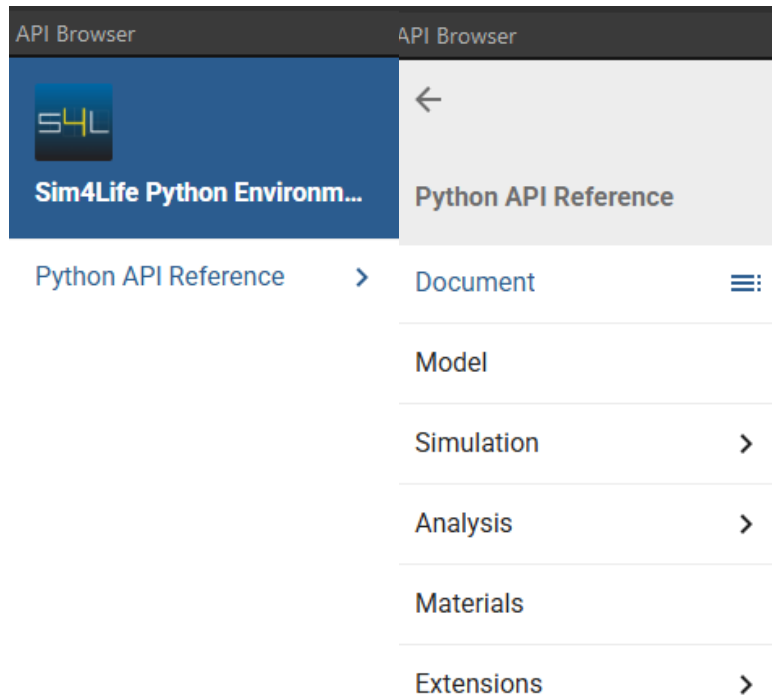
- AllAlgorithms** (CollectionOfAlgorithms) –
- AllSimulations** (CollectionOfSimulations) –

 A table of contents is visible on the right side of the API browser page, listing various API elements like "AllAlgorithms", "AllSimulations", "FileName", "FilePath", "ArchivingOptions", "Close", "CreateArchive", "New", "NewDocument", "Open", "Save", "SaveAs", "SaveCopyAs", "SaveDocument", and "SaveDocumentAs".

# Python 支援文件與介面

## (2) workflow 優化

- 提升了圖形介面 (GUI) 與 Python workflow 之間的一致性，並提供更清晰的 API 結構與易於存取的文件，藉此支援大規模的腳本驅動研究



# 使用者體驗

## 精簡化新版本安裝檔

- 本版本後續的更新將以**精簡版安裝程式**的形式提供，不僅檔案體積小且下載快速，提供更便利的升級體驗

名稱	修改日期	類型	大小
Sim4Life-9.4.0.21184_installer.exe	2026/3/6 下午 12:23	應用程式	8,124 KB
Sim4Life_setup_9.4.0.21184.7z.001	2026/3/6 下午 01:24	001 檔案	512,000 KB
Sim4Life_setup_9.4.0.21184.7z.002	2026/3/6 下午 01:31	002 檔案	512,000 KB
Sim4Life_setup_9.4.0.21184.7z.003	2026/3/6 下午 01:37	003 檔案	512,000 KB
Sim4Life_setup_9.4.0.21184.7z.004	2026/3/6 下午 01:43	004 檔案	512,000 KB
Sim4Life_setup_9.4.0.21184.7z.005	2026/3/6 下午 01:50	005 檔案	512,000 KB
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Sim4Life_setup_9.4.0.21184.7z.012	2026/3/6 下午 02:31	012 檔案	128,003 KB