**Traduction :** Hugo Drouin-Vaillancourt, SMAC.

**Source :** http://www.ams.org/mathmoments/mm34-unlocking-the-cell.pdf

**Comprendre les mystères des cellules**

Les processus cellulaires sont fascinants, mais leurs mécanismes restent très mystérieux. Les biologistes moléculaires et les mathématiciens utilisent des modèles pour commencer à comprendre des opérations comme la division cellulaire, le mouvement et la communication (à la fois intra et intercellulaire.) L’analyse des cellules requiert l’utilisation de plusieurs branches des mathématiques puisque l’activité cellulaire implique une combinaison de modèles continus basés sur les équations différentielles et de modèles discrets necessitant des outils tel que la théorie des graphs.

Cela peut paraître surprenant, mais les fonctions cellulaires sont décrites avec des diagrammes de branchement complexes comprenant des …, des interrupteurs,

**Unlocking the Cell**

The processes that cells perform are as wondrous as their individual mechanisms

are mysterious. Molecular biologists and mathematicians are using models to begin

to understand operations such as cellular division, movement, and communication

(both within the cell and between cells).The analysis of cells requires many diverse

branches of mathematics since descriptions of cellular activity involve a combination

of continuous models based on differential equations and discrete models

using subjects such as graph theory.

It may be surprising, but cell functions are depicted with complex wiring diagrams

of circuits with signaling pathways, gates, switches, and feedback loops. Researchers

translate the diagrams into equations, which are often solved numerically. Solving

the equations is only part of a process in which solutions are analyzed, models are

refined, and equations are reformulated and re-solved.This may be repeated many

times.The aim of this process is an accurate representation of cell behavior, which

may allow drugs and treatments to be designed in the same precise way that electronic

circuits are today.

**For More Information:** *Computational Cell Biology,* Christopher P. Fall,

Eric S. Marland, John M.Wagner, and John J.Tyson, Editors.

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Image: Filamentous actin and microtubules in mouse fibroblasts

(Dr.Torsten Wittmann), courtesy of Nikon Small World.

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