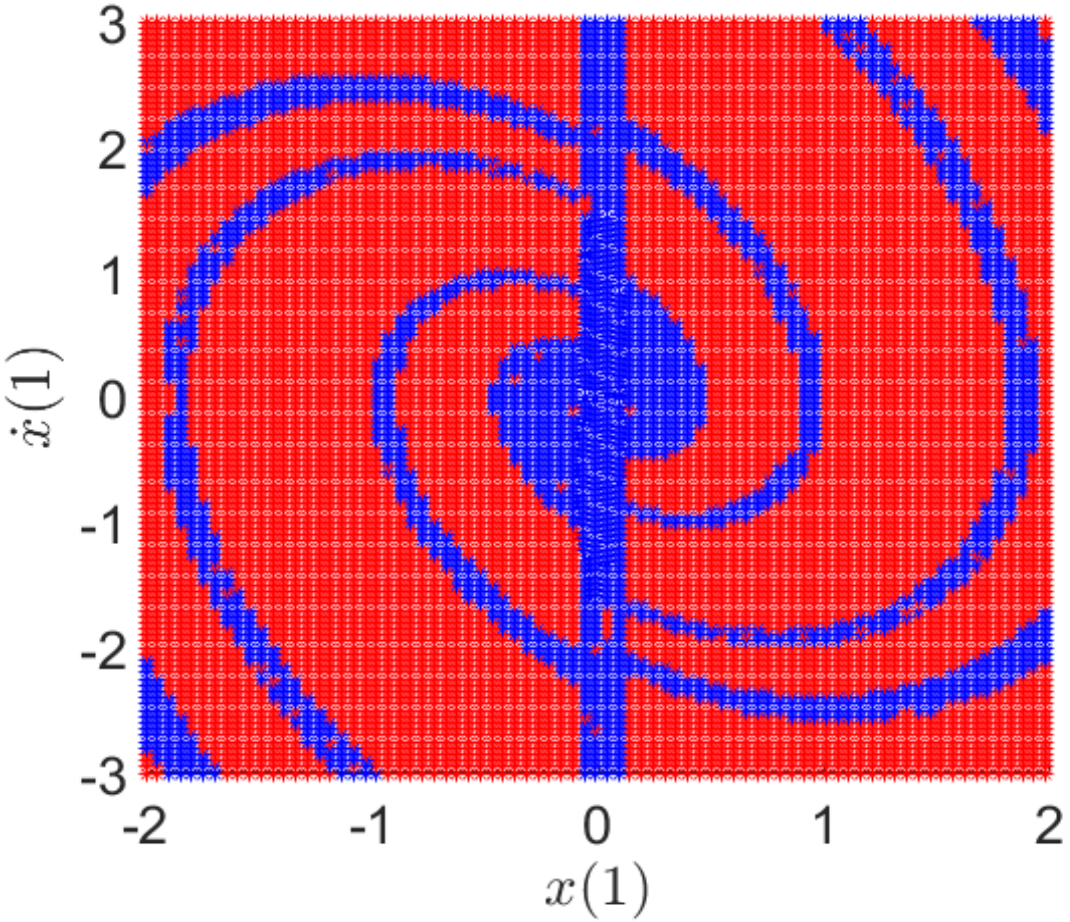
# Basins of attraction

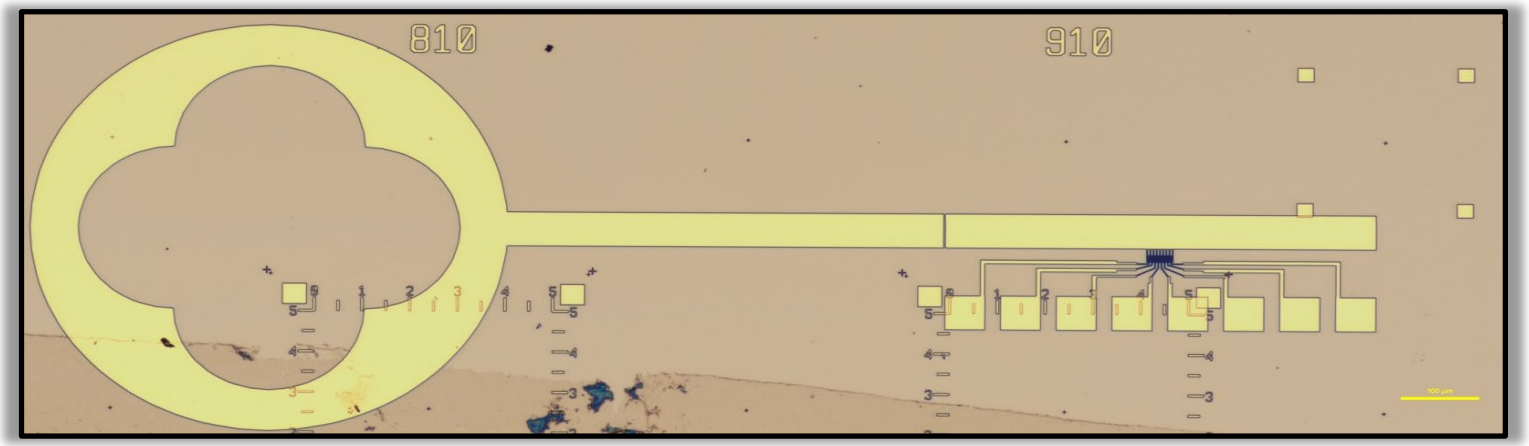
Suparno Bhattacharyya, advised by Dr. Joseph Cusumano




Basins of attraction corresponding to the tip displacement of a kicked cantilever beam normalized to unit length. The simulation reveals the existence of two attractors: a fixed point (stable equilibrium), and an oscillatory solution (limit cycle), with two corresponding basins of attraction shown with blue and red markers, respectively.

# Unlocking Graphene

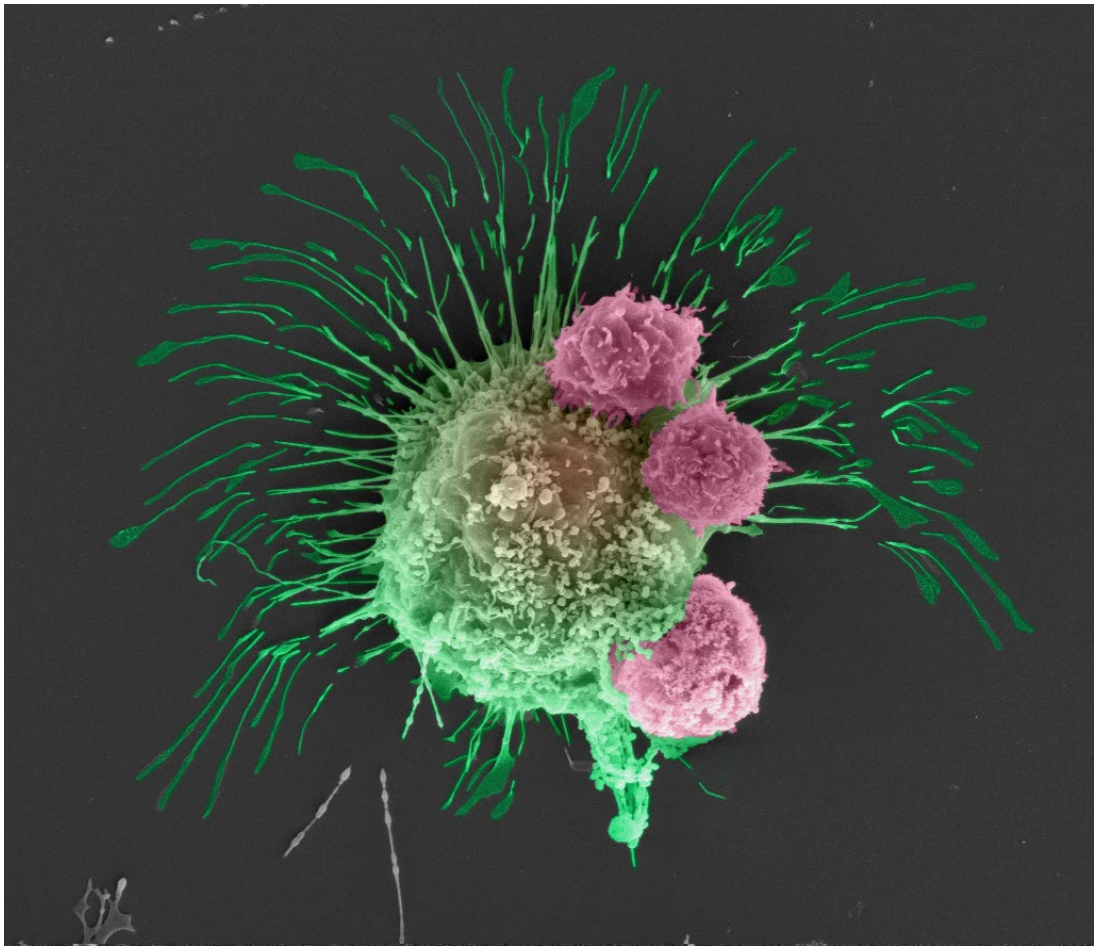
Drew Buzzell, advised by Saptarshi Das




*A 1.7mm long Ni/Au "key" composed of a graphene field effect transistor array and decorative bow. Structure contains 8 individual graphene transistors acting as the "bit" of the key. It was fabricated using electron beam lithography and electron beam deposition.*

# T cells attacking a cancer cell

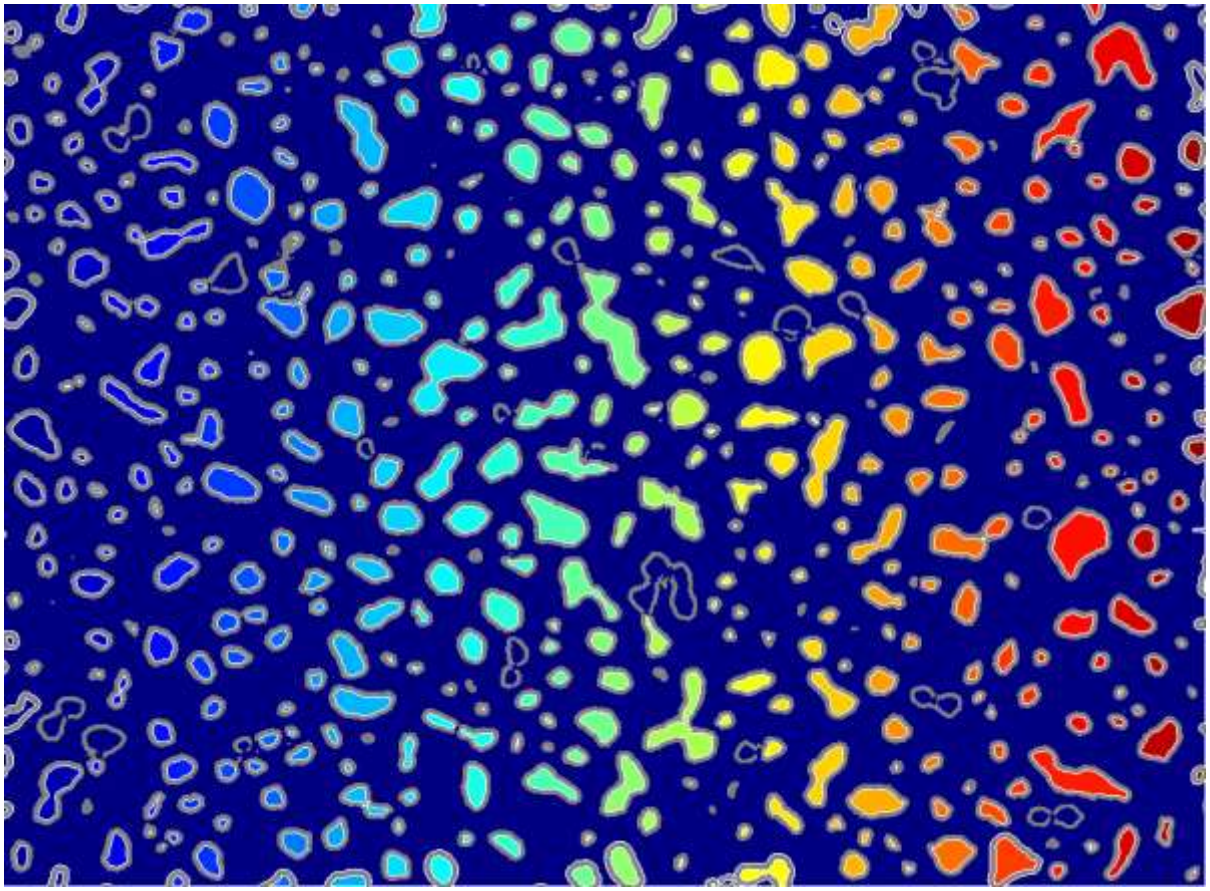
Madhuri Dey, advised by Ibrahim Ozbolat



*A Scanning Electron Microscope image of engineered T cells (pink) attacking a breast cancer cell (green) . These T cells are modified to express a ligand which can bind to a receptor on the cancer cell surface and eventually induce cancer cell death.*

# Bio-cryptography key

Akhil Dodda, advised by Saptarshi Das



*An image of the bacterial population identified using digital image processing tool. This image is binarized and used as secret key to encrypt and decrypt the message shared in an insecure communication channel*

# Biomineralization

KAZIM KERIM MONCAL, advised by IBRAHIM TARIK OZBOLAT

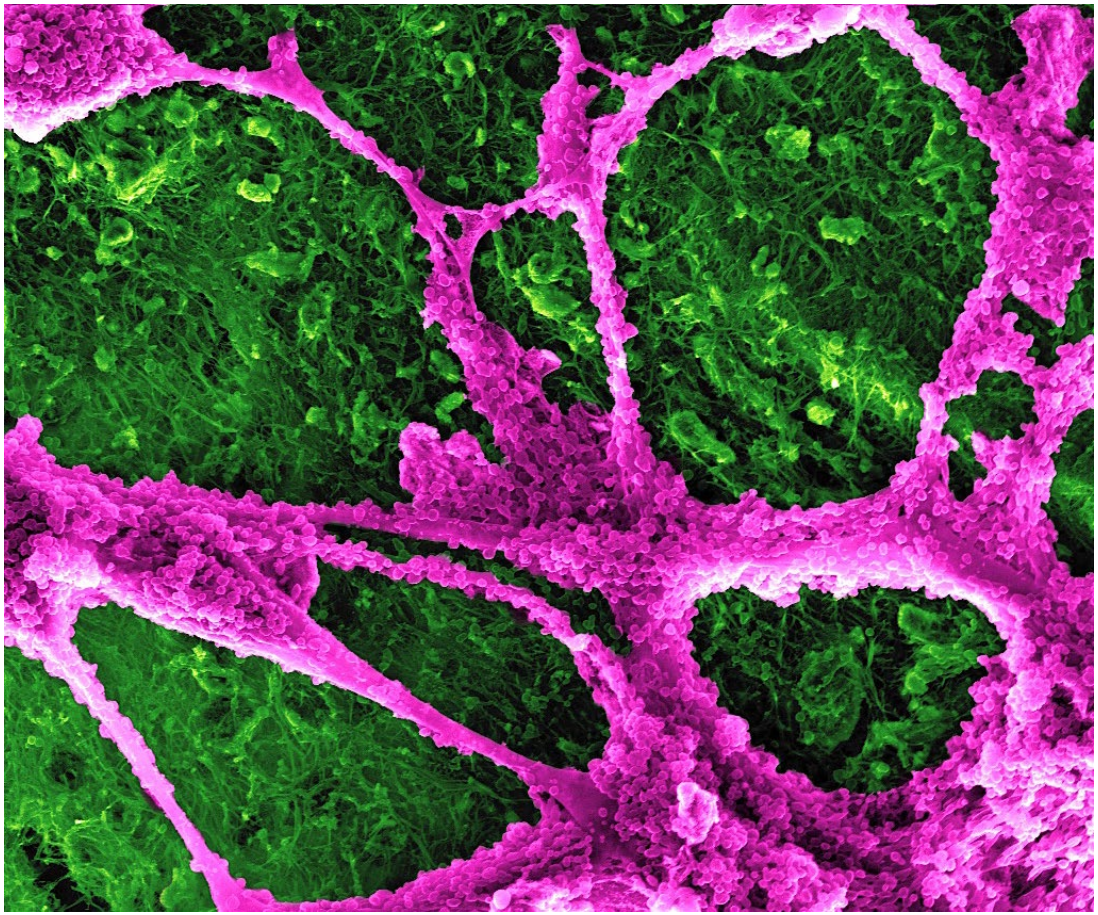
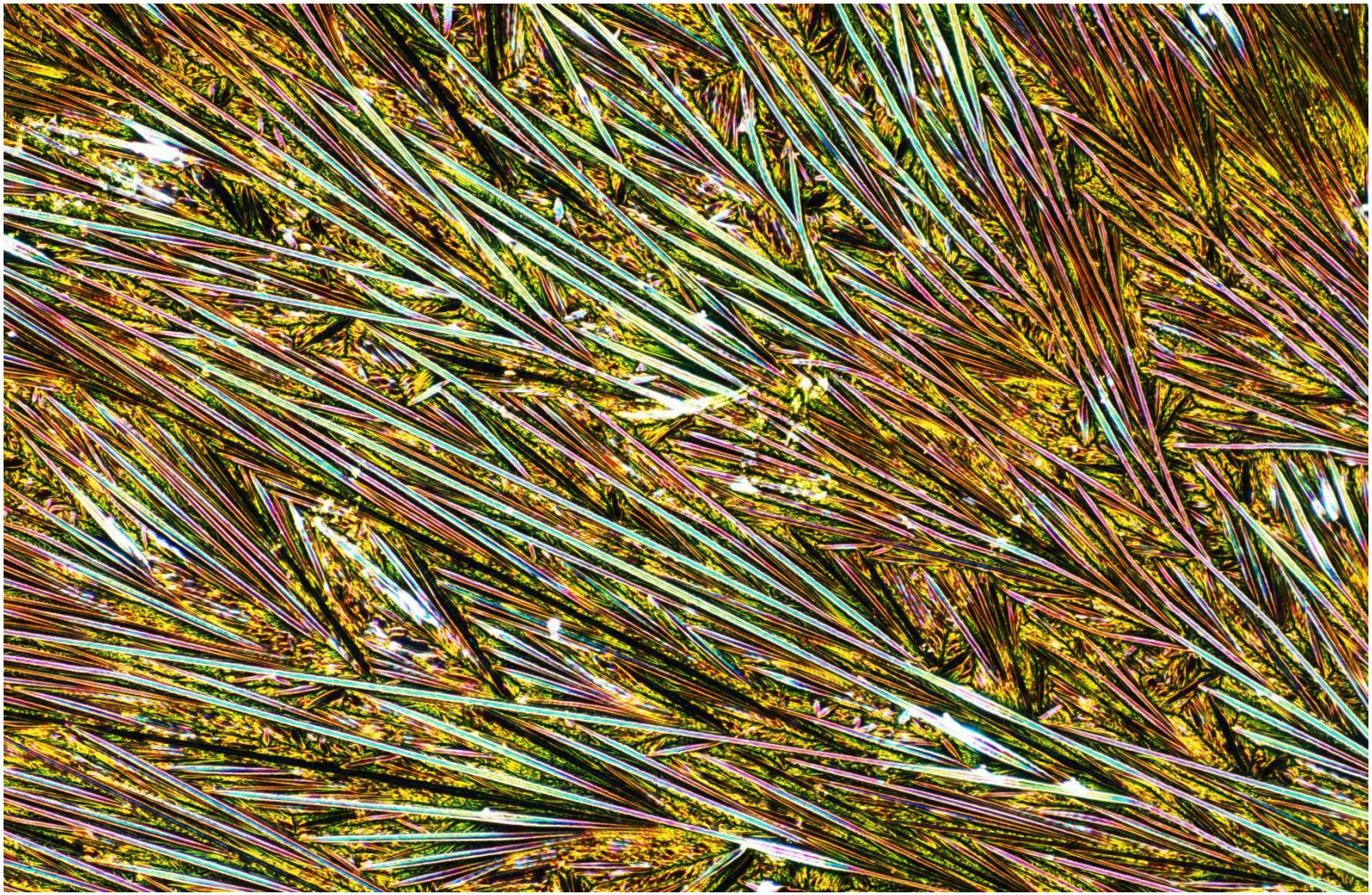


*Figure. Biomineralization process of calcium and phosphate forming mineralized bone-like nodules within the extra-cellular matrix during the late stage of osteogenic differentiation of rat bone marrow mesenchymal stem cells towards the osteoblastic lineage building strong connective bone tissue formation within 3D bioprinted construct.*

# Aggregation of $SiO_2$ nanoparticles

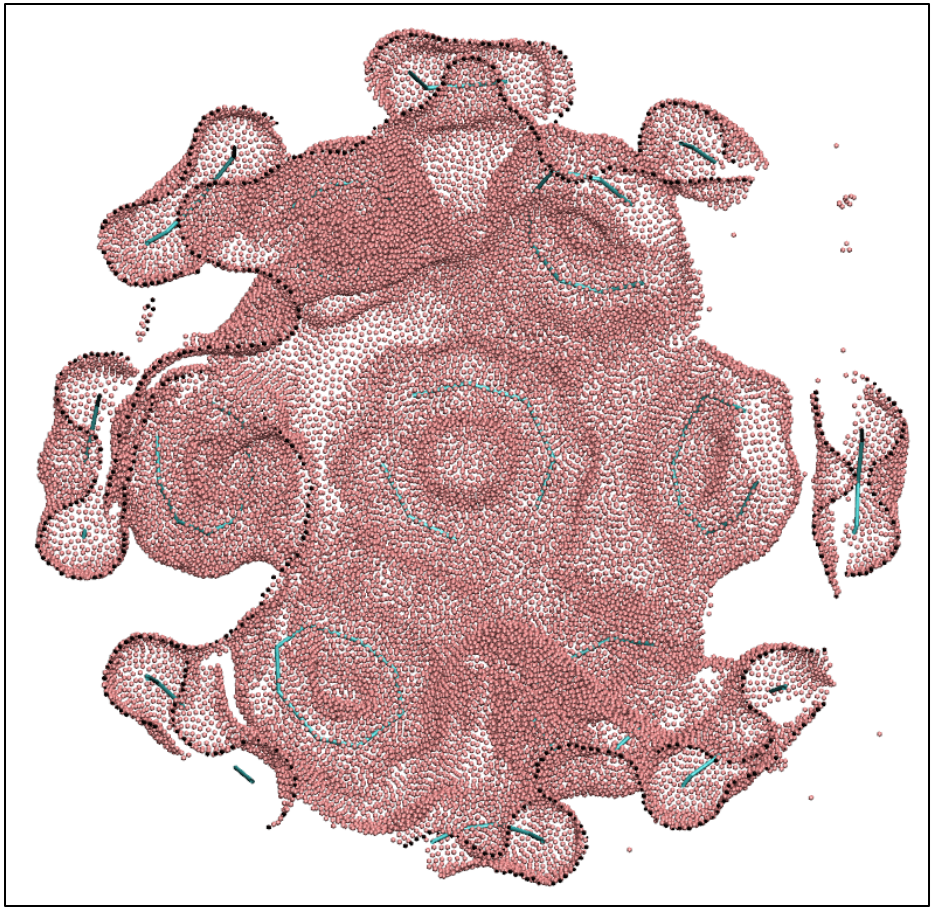
Amritanand Sebastian, advised by Saptarshi Das



*Organization of $SiO_2$ nanoparticles to form fractal patterns on a Si wafer. The dense branch-like pattern is formed during etch of 300nm thick $SiO_2$ layer by NaOH solution.*

# Molecular Donuts

Pranjal Singh, advised by Sulin Zhang



*Molecular 'donuts' fused to form the nuclear envelope in an MD simulation. Membrane rings (shown in cyan) of the nuclear pore complex are postulated to introduce pores in the nuclear envelope. The porous nuclear membrane can be thought of as several donuts fused together.*