Model management with *Dynamo*:
Filament geometry:
We are going to demonstrate the basic ideas and tools on synthetic data sets.

Those data sets are available through the catalogue manager, thus:

>> dcm

to start the catalogue manager:
We create a tomogram that includes tubular looking objects.

The catalogue manager will create a catalogue to archive the created tomogram and also the models that we will create around it.
and then open it with tomoslicer when it finishes we just select the (only) created tomogram.....
you can drag the slice with the cursor

you might want to fix the contrast.
We pick with [1] one of the tips of one filament. It is called ‘North’ point in the [Anchors] Menu.
with [2] we mark a second point (called the ‘South’ point in the [Anchors] panel)
We can even mark a third one to select the width of a plane....
... [set a plane] for the three points we just clicked.
You can rotate around the axis with this slider.
Here, we would have several options to click points that will define a *backbone*.

A backbone represents a “smooth” version of the path of the filament, foreseen to encompass the case of bent filaments.

But we have to define first a **model**, otherwise Dynamo will not know what to do with the points that we define.

We choose a model type called *filamentWithTorsion*, which operates creating crop points along the filament path.
We will see how to convert the *clicked points* into *crop points* for this particular geometry later.

By now, we have first to just create those points, so remember the basic controls:

- CLICK a point: [C] key
- Delete last clicked point: [DELETE] key
- Delete a point: secondary click, then select option

We have actually several options to create the points.
OPTION A: click in in the plane that traverses the filament

CLICK a point: [C] key
OPTION B: click in transversal slice

While this will probably work for reasonably straight filaments, sometimes the filaments are bent or appear together with many other objects and are difficult to show a plane where you can pick all points at once.

In those cases we should generate orthogonal sections along the path.
If you want to try this B) option, just delete the model that we just generated:
... and just recreate it...
select a size

and generate a set of orthogonal sections
You get several orthoslices where the center of the filament is totally apparent.
and you click directly on the centers [in lexicographical order]
The main window gets updated as you click on the ‘slices along the path’ window.
Workflow to define crop positions on model "mfilamentWithTorsion"

Save

1. Create a smooth backbone
   - Radius: 5
   - Interval in backbone: 2
   - # Backbone points: 102

2. Create final positions and angles for particle cropping
   - Subunits dz: 2
   - Subunits dphi: 60
   - # Crop points: 0

3. Save resulting model into catalogue

Controls
- Execute selection
- Execute all
Workflow to define crop positions on model "mfilamentWithTorsion"

- **Create a smooth backbone**
  - radius: 5
  - interval in backbone: 2
  - # backbone points: 102

- **Create final positions and angles for particle cropping**
  - subunits dz: 2
  - subunits dphi: 60
  - # crop points: 0

- Save resulting model into catalogue

**Controls**
- execute selection

**Figure 13**

Model: mfilamentWithTorsion

- Plot points entered by the user
- Plot computed backbone
Workflow to define crop positions on model "mfilamentWithTorsion"

- **Save**
  - create a smooth backbone
    - radius: 5
    - interval in backbone: 2
    - # backbone points: 102
  - plot points entered by the user
  - plot computed backbone
- **Create final positions and angles for particle cropping**
  - subunits dz: 2
  - subunits dphi: 60
  - # crop points: 0
- **Save resulting model into catalogue**

**Controls**
- execute selection
Workflow to define crop positions on model "mfilamentWithTorsion"

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1. Create a smooth backbone
   - radius: 5
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Controls
- execute selection
- execute all
We get too many points
But if we change the parameters...

..and actualize [create final positions]...

The crop positions get updated...
Don’t forget to save your work into the catalogue (= hard disk)
and we could crop particles already
select size...

... and go!
click here to explore the cropped particles...