Subject: Re: I need to bulid a digital phantom urgently, Thanks for help!
Posted by huiqiang.liu.37 on Tue, 23 Apr 2013 06:23:56 GMT
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Dick,
Thank you for the prompt reply.

Yes, i agree with you that the 75% packing fraction is very tight with varying size spheres, just like i konwn that someone achieved this model by using the forecasting software Crystal Ball.

yes, i want to create 3D volume array of values with three types of values: background(simulating lung tissue),sphere shell(alveoli,about size of 8-12um),hollow sphere interior(air-filled). of course , if the model does work, it will have very Strong Commonability for us.

Thanks for your help.
Liu

> huiqiang.liu.37@gmail.com wrote:
>
>> This model is like as follows: a segment of lung tissue was modeled as an
>
>> array of randomly positioned hollowed spheres (simulating alveoli). A
>
>> 1*1*11.6 mm3 volume was created to match the thickest lung region (11.6 mm),
>
>> with simulated alveoli given a 75% packing fraction and a Gaussian
>

>

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>>
>
>> Thank you so much. Liu
>
>
>
> Liu,
>
>
>
> In researching this a bit, it looks like 75% packing density is not possible
>
> with identical spheres...:

>
> http://en.wikipedia.org/wiki/Random_close_pack#For_spheres
>
>
>
> ... but with the variety of sizes as you described, it may be possible to
>
> approach that. 75% is in fact very, very tight.
>
>
>
> In any case, my first idea, to place spheres into a volume randomly (without
>
> overlap) until the volume is full enough, is clearly not going to work. I think
>
> there's no chance of getting close to this optimal packing by random placement.
>
> Perhaps someone out there has done this kind of thing before? Perhaps starting
>
> with a random set of spheres, and an optimization algorithm to have them push
>
> apart until they no longer overlap? I am reminded of something seen in data
>
> visualizations called force-directed graph drawing:
>
> http://en.wikipedia.org/wiki/Force-directed_graph_drawing
>
>
>
> These other issues (which I wrote about first) are comparatively minor!:
>
>
>
> In order to help you, I think we need more a little more information. I guess
>
> you're looking to create a 3-D volume array of values with possibly three types
>
> of values:
>
> - background
>
> - sphere shell, and
>
> - hollow sphere interior
>
> If the spheres are hollow, we also need to know how thick the shell is (or the
>
> diameter of the interior sphere), whether a constant or perhaps a fraction of a

> given sphere's diameter.
>
> Also necessary is a scale for the array, that is the physical size represented
>
> by each 3-D array element, or voxel. I'll assume the voxels are cubes.
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>
> --
>
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>
> Cheers,
>
> -Dick
>
>
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