

# 19<sup>th</sup> International Technical Footwear Congress

February 03-05, 2016, Chennai, INDIA

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*Shaanxi university of  
science and technology  
institute of modern  
function shoe*

*For more information...*



+86 29 86168257



[gongts@sust.edu.cn](mailto:gongts@sust.edu.cn)

[shoes200809@163.com](mailto:shoes200809@163.com)



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## The Establishment of Foot Model Based on CT Images

LI Shu 2016.02



# The Establishment of Foot Model Based on CT Images



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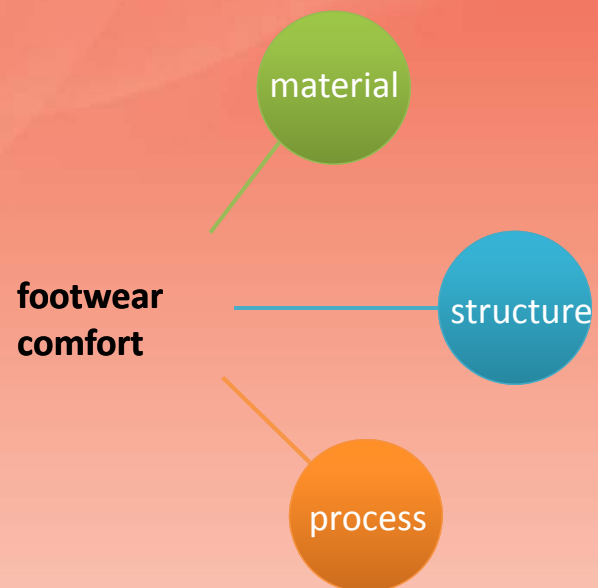


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## The Establishment of Foot Model Based on CT Images

### ■ Introduction



## The Establishment of Foot Model Based on CT Images

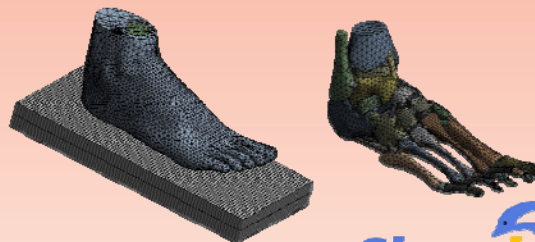
### ■ Introduction

Foot CT scan images

Soft tissues, bones  
segmentation

3D model of bones and  
soft tissues

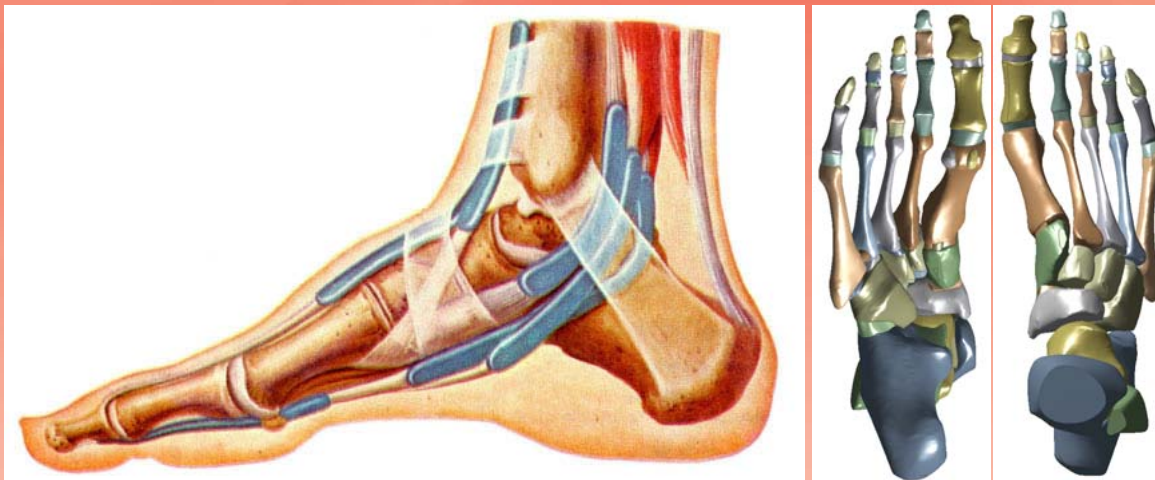
FE model of human foot





## The Establishment of Foot Model Based on CT Images

### ■ 1 Ankle structure



Bones, articular cartilage, ligament, muscle, tendon, joint capsule and skin.

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## The Establishment of Foot Model Based on CT Images

### ■ 2 Data acquisition for modeling



The normal foot of a male whose foot length is 255mm is the modeling object. According to this standard, a male university student is the subject whose foot type is closer to the normal foot. Besides he is in a good physical condition without flat feet or high arches and understands the experimental intention.



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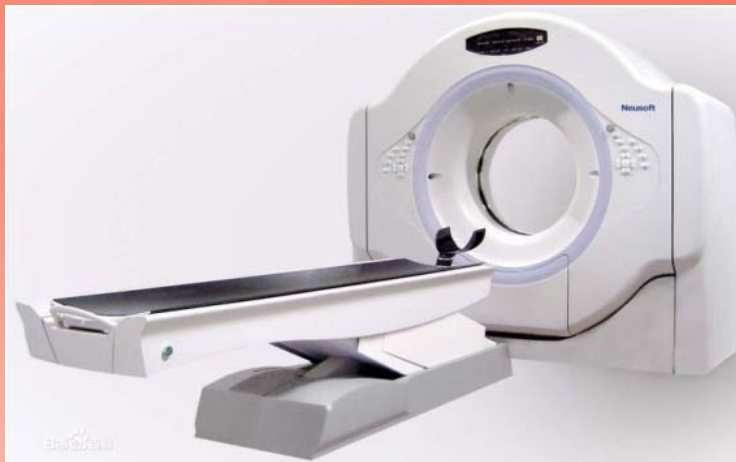


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## The Establishment of Foot Model Based on CT Images

### ■ 2 Data acquisition for modeling



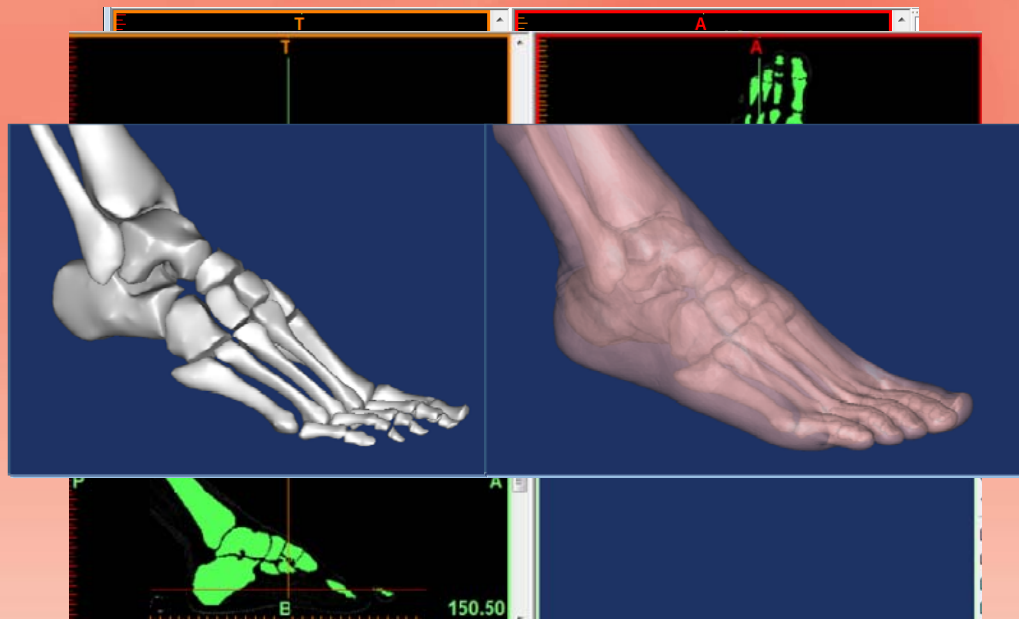
Scan the right foot of the volunteer by CT to get the Standard DICOM format file. Scan thickness is 0.67mm.





## The Establishment of Foot Model Based on CT Images

### ■ 3 Establishment of foot solid model



Then, hold segmentation by threshold to separate polygons of foot bone. At last, calculate 3D coordinates used to shape model of foot bone.

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## The Establishment of Foot Model Based on CT Images

### ■ 3 Establishment of foot solid model



Build some reference planes to divide the bone, these planes are parallel, the distances between them are 0.5-0.8mm.



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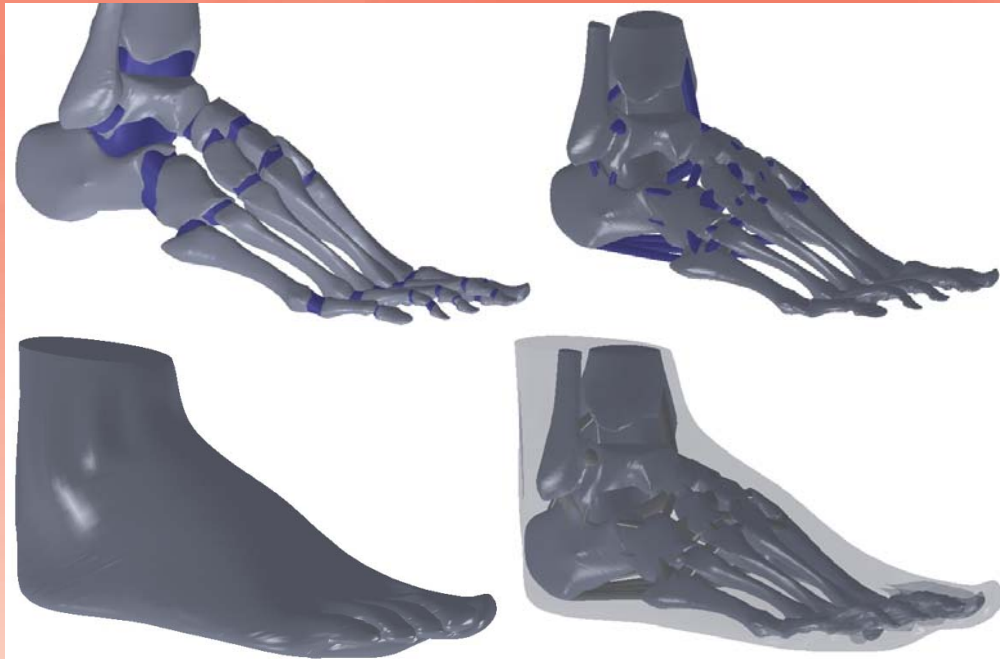
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## The Establishment of Foot Model Based on CT Images

### ■ 3 Establishment of foot solid model





## The Establishment of Foot Model Based on CT Images



### ■ 4 Summary

(1) Based on foot CT data, we can use Mimics, SolidWorks and ANSYS Workbench to rebuild foot model.

(2) The distance between the reference planes that is used to divide bones is small, so we can get an accurate bone model.

(3) We don't change the relative position between different parts of foot, so the built foot model is also very accurate.

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Thank you for your attention!

