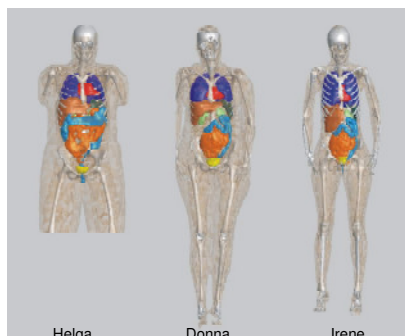


Challenge

Voxel models constructed from image data of living persons offer an anatomically realistic representation of the human body and therefore an improvement to MIRD-type models.



Computational models of the human body can be applied to all kinds of dose calculations, e.g. the ICRP is using voxel models for future dose calculations. The availability of voxel models from medical image data of real persons is increasing as well as their widespread use at various research institutes all over the world. However, existing voxel models are limited with respect to representing average populations, since they have individual organ topology and organ masses.

Technology

To cover the whole range of human physiognomy a representative group of voxel models was developed at the Helmholtz Zentrum München (German Research Center for Environmental Health). They are based on CT or MRT image data of patients, consisting of about 2-5 million voxels. Whole or partial body models comprising 60-130 different organs and tissues are available. There are further models in preparation, such as a pregnant woman and an 8-year old child. The voxel models are successfully used to evaluate the impact of the human body on calculated organ doses from ionising radiation. However, these models are also suitable for an adaptation towards other environmental parameters or e.g., for calculation of the impact of pressure or mechanical force on the human body.

Name	Sex	Age	Weight (kg)	Height (cm)	Voxel resolution	
					In-plane (mm)	Slice thickness (mm)
BABY	female	8 weeks	4.2	57	0.850 x 0.850	4
CHILD	female	7 years	21.7	115	1.540 x 1.540	8
DONNA	female	40 years	79	170	1.875 x 1.875	10
HELGA*	female	26 years	81	170	0.980 x 0.980	10
IRENE	female	32 years	51	163	1.875 x 1.875	5
LAURA	female	43 years	59	167	1.875 x 1.875	5
KATJA	female (pregnant, 24. wk)	43 years	62.3	163	1.775 x 1.775	4.8
FRANK*	male	48 years	95	174	0.740 x 0.740	5
GOLEM	male	38 years	68.9	176	2.080 x 2.080	8

*Partial body: head and torso

Commercial Opportunity

Human voxel datasets are available for in-licensing.

Further Reading

N Petoussi-Henss, M Zankl, U Fill and D Regulla (2002) Phys. Med. Biol., Vol. 47, p. 89-106
Zankl et al. (2003) Radiation Protection Dosimetry, Vol. 105, p. 539-48

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