

## Ultrasound courses on human physique: SUM – Standardised Ultrasound Method

The courses are designed for a broad class of addressees including clinicians from a range of specialities, sports medicine physicians, physiotherapists, nutritionists, trainers, sport scientists, and experts affiliated with sport federations.

The goal of the BASIC (2 days) and ADVANCED LEVEL (1 day) courses, usually conducted in one block, is to reach the high accuracy and reliability level for measuring subcutaneous adipose tissue (SAT) – as described in Müller W. et al. (Sports Med 2020, Br J Sports Med 2016; complete description in the Book 2025; see PUBLICATIONS) – and to reach the competency to conduct research and application projects based on high quality data. The book on: *Beyond BMI: Accurate Measurement of Body Composition – A Change of Paradigm* (2025) is included in the course fees and serves as the course handbook.

To prepare for the course, it is recommended that you study the two methodological publications from 2016 and 2020 thoroughly in advance (including the electronic supplementary materials), which summarise the scientific background of the SUM. Preceding experience with diagnostic (B-mode) ultrasound (US) is advantageous.

The NISOS-BCA software is designed for WINDOWS operating systems.

### First part (BASIC LEVEL):

Marking of the eight standardised sites for ultrasound imaging of SAT (subcutaneous adipose tissue).

Getting started with US imaging – basic instrument settings and probe handling skills.

Getting started with the semi-automatic (inter-active) image evaluation software NISOS-BCA.

Quantitative evaluation of ultrasound SAT images

Sums ( $D$ ) of the eight thicknesses ( $d$ ) and means ( $d_{\text{mean}}$ ).

Thicknesses including (I) and excluding (E) embedded fibrous structures (fasciae).

Validity, accuracy and reliability of SUM.

Meta-data protocol sheet (personal and anthropometric data, physical activity, performance level).

Standardised, accurate and reliable measurement anthropometric variables.

Mass Index (MI) – correction of the BMI for body shape and sex.

Waist Index W/h – a measure of central adipose tissue for estimating 'years of life lost'.

Further anthropometric indices

Supervised US image capturing (series of eight sites)

Supervised US image evaluations with the NISOS-BCA software.

Comparison of results, discussion and correction of errors.

**Second part (ADVANCED LEVEL, part A):**

Usage of all features of the NISOS - BCA software, including export functions.

Inter-observer study performed by the participants (competency test).

Comparison of results, analysis of errors and measurement deviations.

Interpretation of the obtained data sheets (*collection reports*).

Normative data of SAT for athletes and for the general population.

Estimated SAT mass in kg and in percent of body mass, specification of error ranges.

SAT patterning analyses.

Relevance of the *direct* SUM adipose tissue measurement in medicine and sport.

Comparison to other (*indirect*) methods, error ranges, and accuracy and reliability demands.

Discussion of study ideas and designs.

**Post course training (ADVANCED LEVEL, part B):** the course fee includes the software license for the additional post-course SUM measurements to obtain the *Advanced Level Certificate*.

**IASMS-certifications:**

Certificates of successful course participation are issued by the IASMS.

**SUM course prices:** see COURSE REGISTRATION

**NISOS BCA software prices:** see [www.nisos.at](http://www.nisos.at)

On behalf of the IASMS team

Wolfram Müller, PhD

Professor of Medical Physics and Biophysics, Scientific Course Leader