



**Day, Date & Time:** Saturday, May 17, 2014 at 1020h

**Venue:** Assembly Hall, Government College, Hyderabad, Pakistan <http://www.gch.edu.pk>

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**Anthromathematics**, defined as the mathematics of human body sizes, forms, proportions and structures, was introduced on March 22, 2010 by the speaker during the First Conference on Mathematical Sciences held at University of Karachi<sup>1</sup>. The sciences of *anthropology* (study of human being) and *anthropometry* (measurement of human being) were transformed to *anthromathematics* through ideas from analysis, algebra, topology, number theory and logic. An *anthropometrist* measures heights, but an *anthromathematician* takes measurements and determines accuracy, precision as well as reproducibility of the techniques employed, during session-planning, aligns the scale, ascertains surface-level and checks equipment against agreed-upon standards at the beginning of each session and estimates collected-data consistency at the conclusion of every session. Mathematics plays an important role in developing and improving sports activities<sup>2</sup>. In *sport medicine*, *kinesiology* and *sport-performance analysis*, infrastructure, facilities and human resources are available at SF-Growth-and-Imaging Laboratory. Project of gait analysis is conducted in collaboration with Government College, Hyderabad<sup>3</sup>. Edge-based rasterstereography is being used to generate curvature maps of human back during a gait cycle. Skeletal examination of school athlete, with a focus on detection of trunk deformities, in particular scoliosis, must be mandatory in the age range 9-11 years. In the area of *sport-performance analysis*, undesired sigittal-plane motion during vault performance by gymnast should be monitored using edge-based moiré. The goals of a childhood exercise-program are to increase fitness level<sup>4</sup> and reduce obesity through quantitative recommendations<sup>5</sup>. Diet-cum-exercise programs in peripubertal students must be integrated with periodic head-to-toe examinations by developmental pediatricians to account for *Puberty-Induced Energy-Channelization (Eenergy-Channelization III)*, in which a temporary drop in height percentile is accompanied by jump in mass percentile, as the student enters puberty (example presented in Additional File, page 23 — address at 3<sup>rd</sup> line from the bottom).

**Keywords:** Height, weight, posture, gait gymnastic performance, puberty-induced energy-channelization

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| <p>MSc<br/><b>Sport Mathematics</b><br/><i>Anthropology &amp; Gymnastics</i></p> | <p>MSc<br/><b>Anthromathematics</b><br/><i>Algebraic Topology &amp; Orthopedics</i></p> |
| <p>MPhil<br/><b>Anthromathematics</b><br/><i>Advanced Anthromathematics</i></p>  | <p>PhD<br/><b>Anthromathematics</b><br/><i>Topics in Anthromathematics</i></p>          |

**New programs to be offered by Department of Mathematics**

<sup>1</sup><http://www.ngds-ku.org/Presentations/Firdous.pdf>

<sup>3</sup><http://www.ngds-ku.org/Presentations/Gait.pdf>

<sup>5</sup><http://www.ngds-ku.org/Presentations/Roadmap.pdf>

<sup>7</sup><http://www.ngds-ku.org/Papers/J30.pdf>

**Speaker: Prof. Dr. Syed Arif Kamal**

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**About the speaker:** Prof. Dr. Syed Arif Kamal, Professor and Head, Anthromathematics Group is serving as Chairman, Department of Mathematics for his second term. He remained Convener of HEC NCRC for Mathematics (2004-2012) as well as Convener, NTS Subject Committee for Mathematics (2009-2012). Since 2012, he is serving on NTS Subject Committee for Physical Education, Health and Sport Sciences. Since 2011, he has been appointed Convener, Sub-Committee (Academics) of the Education Committee, Transparency International Pakistan (TIP). He obtained his BSc (Honors) *summa cum laude*, MSc *summa cum laude* and PhD from University of Karachi, MS from Indiana University, Bloomington, United States and MA from the Johns Hopkins University, Baltimore, United States as Quaid-é-Azam Scholar. His awards and honors include throughout First-Class-First Position and 4 gold medals for scholastic achievements. He led teams in 15 different capacities throughout his 35-year career with progressively-increasing responsibilities, which included laboratory setup and team management. He has 151 papers to his credit. His work in the area of Physical Education and Sports Sciences spans over a period of 35 years. During 1979-1982, he was a member of American Association of Health, Physical Education and Recreation. He worked with health professionals on clinical problems at the James Whitecomb Riley Hospital for Children, Indianapolis, Indiana, United States and Malmö General Hospital, Malmö, Sweden. Since 1998, he is Project Director of the NGDS Pilot Project (<http://ngds.uok.edu.pk>), dealing with anthropometry as well as growth and obesity monitoring of the Pakistani children. In 2003, he trained master anthropometrists of TAWANA PAKISTAN. In 2010, he increased ten-fold, the accuracies of height and mass measurements<sup>1</sup>. Recently, he completed his study on primary-physical education practices in Pakistan and England, which is submitted for publication. Notable concepts put forward by him in the areas of anthromathematics and sport mathematics are quantitative estimates of obesity/wasting and stunting/tallness<sup>6</sup>, optimal mass<sup>6</sup>, estimated-adult BMI<sup>7</sup>, pseudo-gain of height or mass<sup>8</sup>, quantitative recommendations for reducing masses in case of obese children<sup>5</sup> and energy-channelization problem<sup>8</sup>, in particular, puberty-induced energy-channelization (this seminar). He studied at Government College, Hyderabad during 1971-1973 for his HSC. In year 2013, he was elected Member, Executive Committee of GCH Alumni Association (Karachi Chapter). He organized the *First Conference on Anthromathematics* in Government College, Hyderabad last year. On September 4 of the current year, the *Second Conference on Anthromathematics and Sport Mathematics* is to be held in this college.

<sup>2</sup><http://www.ngds-ku.org/Presentations/Sports.pdf>

<sup>4</sup><http://www.ngds-ku.org/Presentations/Fitness.pdf>

<sup>6</sup><http://www.ngds-ku.org/Papers/J29.pdf>

<sup>8</sup><http://www.ngds-ku.org/Papers/J32.pdf>

**Web address of additional file:** [http://www.ngds-ku.org/Presentations/Sport\\_Mathematics/Additional\\_File.pdf](http://www.ngds-ku.org/Presentations/Sport_Mathematics/Additional_File.pdf)

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