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## MATHEMATICAL BIOLOGY GROUP Publications, Theses and Presentations

*My Philosophy of Life*  
While there is a will there is a way

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#### Key to Institutions

Albert Einstein College  
Indiana University  
Johns Hopkins University  
Karachi University  
Lund University

Oklahoma University  
Sir Syed University

- For each item, the line containing **AUTHORSHIP(S)** mentions, in the left-hand column, name of the institution (listed, below, alphabetically), where the work was performed:
  - The Albert Einstein College of Medicine, Bronx, New York 10461, USA
  - Indiana University, Bloomington, Indiana 47405, USA
  - The Johns Hopkins University, Homewood Campus, Baltimore, Maryland 21218, USA
  - University of Karachi, University Road, Karachi 75270, Pakistan
  - University of Lund, Malmö General Hospital (Spinal Unit), S-21401, Malmö, Sweden
  - University of Oklahoma, Norman, Oklahoma 73019, USA
  - The Sir Syed University of Engineering and Technology, University Road, Karachi 75300, Pakistan

#### Papers 2011

Abstract  
Full Text  
Karachi University

- Papers in modeling of physiological systems, 3-D bio-imaging and biomechanics:
- **Growth-and-Obesity Profiles of Children of Karachi using Box-Interpolation Method**

<http://www.ngds-ku.org/pub/jourabstA.htm#J29>:  
<http://www.ngds-ku.org/Papers/J29.pdf>

**KAMAL SA**, Jamil N, Khan SA, *International Journal of Biology and Biotechnology* **8(1)**, 2011, 87-96

Abstract  
PDF  
Karachi University

- **Anthromathematics: A New Branch of Mathematics**

<http://www.ngds-ku.org/pub/confabstA.htm#C85>:  
<http://www.ngds-ku.org/Presentations/Anthromath.pdf>

**KAMAL SA**, *the Sixth Symposium on Computational Complexities, Innovations and Solutions (CCIS 2011)*, COMSATS Institute of Information Technology, Abbotabad, KP, Pakistan, 2011, abstract # 1, pp 13, 14 (keynote lecture)

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- 2010**
- **An Airport-Passenger-Screening System based on Emitted IR and Thermal Radiation**  
<http://www.ngds-ku.org/pub/confabst.htm#C81>:  
**KAMAL SA**, *the Fifth Symposium on Computational Complexities, Innovations and Solutions*, COMSATS Institute of Information Technology, Abbotabad, KP, Pakistan, 2010, abstract # 24, p 21
- Abstract*  
Karachi University
- **Mathematics in the Life Sciences**  
*This paper introduced a new branch of mathematics, termed as 'anthromathematics'*  
<http://www.ngds-ku.org/pub/confabst.htm#C79>:  
**KAMAL SA**, *the First National Conference on Mathematical Sciences*, Golden Jubilee Celebration, Department of Mathematics, University of Karachi, 2010, abstract # 10, p 19 (the Syed Firdous memorial lecture)
- Abstract*  
Karachi University
- 2009**
- **Biomedical Applications of 3-D Optical Imaging and Image Processing**  
<http://www.ngds-ku.org/pub/confabst.htm#C76>:  
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- 2008**
- **Role of Mathematics in the Sports Sciences and Technologies**  
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**KAMAL SA**, *the Thirty-Fifth All Pakistan Science Conference*, University of Karachi, Karachi, Pakistan, abstract # 72
  - **Role of Moiré Fringe Topography and Rasterstereography in the Management of Back Pain**  
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- 2004**
- **An Investigation of Growth Profiles of the Pakistani Children**  
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**KAMAL SA**, Firdous S, Alam SJ, *the International Journal of Biology and Biotechnology* **1(4)**, 2004, 709-717
  - **Mathematical Modeling of Physiological Systems**  
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**KAMAL SA**, *the First World Conference on Twenty-First Century Mathematics*, School of Mathematical Sciences, GC University, Lahore, Pakistan, 2004, abstract # 67, pp 19-20
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- **The Human Heart as a System of Standing Waves**  
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**KAMAL SA**, Siddiqui KA, *Karachi University Journal of Science* **30(1&2)**, 2002, 55-63
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Karachi University

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Abstract  
Karachi University
- The Early-Childhood-Integrated-Developmental Examination (ECIDE) for 3-8 Years Old Children  
<http://www.ngds-ku.org/pub/confabst.htm#C54>:  
**KAMAL SA**, *the Aga Khan University National Sciences Research Symposium: Early Childhood Care and Development*, Karachi, Pakistan, 2002, abstract # 17, p 32 (poster presentation)
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Karachi University
- The NGDS Pilot Project: Aiming at the Future of Pakistan  
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- The NGDS Pilot Project: A Software to Analyze Growth of a Child (A Telemedicine Perspective)  
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- A Precedence Graph for the Physical Examination of Children  
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- **EEG in Weightlessness: A Theoretical Estimate**  
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  - **Covariant-Generalized-Coupling Model of Global-Electrocortical Activity**  
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- **A 3-D-Static Model of the Human Spinal Column**  
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  - **Physics of Screening Procedures to Detect Trunk Deformities**  
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- **A Study to Test the Reproducibility of Moiré Topographs**  
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- **Group Structure of a Covariant Model of Global-Electrocortical Activity**  
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- **Effects of Weak Electromagnetic Fields on Global-Electrocortical Activity**  
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Siddiqui KA, **Kamal SA**, *the Seventeenth International Nathiagali Summer College on Physics and Contemporary Needs*, Nathiagali, KP, Pakistan, 1992 (poster presentation)
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Albert Einstein College
- **Role of Moiré Fringe Topography in Skeletal Exam. of School Athlete**  
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- **Neurophysics: A Beginner's Viewpoint**  
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  - **Reproducibility of Moiré Topographs**  
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- 1990**  
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- **A Comparison of Back Moiré Topographs of Children in Sitting and Standing Positions**  
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- 1988**  
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- **Relationship of Anthropometric Measurements Taken on Clothing to Those Taken on the Body**  
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- 1982**  
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- The Early-Childhood-Integrated-Developmental Examination for 3-8 Years Old Children  
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- **The NGDS Pilot Project**  
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Establishment of "National Growth and Developmental Standards (NGDS) for the Pakistani Children"  
*Founder, Project Director and Principal Investigator*
  - Project undertaken under the directives of His Excellency, the Governor Sindh/Chancellor, University of Karachi at the institutions run by Army, Air Force and Navy
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- **The Sibling Growth Pilot Project (SGPP)**  
[http://www.ngds-ku.org/ngds\\_URL/subprojects.htm#SGPP](http://www.ngds-ku.org/ngds_URL/subprojects.htm#SGPP)  
*A subproject of the NGDS Pilot Project*
  - Selected families are invited to participate, in which all siblings in the age range 4-8 years are checked — they are followed up till they reach the age of 11
- Articles**
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  - **Anthromathematics: A New Branch of Mathematics**  
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- 1997**  
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  - **Spacetime Representation in the Brain**  
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- Theses Supervised**
- Supervised theses of the following students (degrees awarded) for their work on modeling of heart, brain, child growth and validation of 3-D-bioimaging techniques — moiré fringe topography and rasterstereography [1 student working for his PhD (face recognition using rasterstereography), 2 students working for their MPhil (scoliosis-detection protocols based on moiré fringe topography)]
- 2009**
- **Adult-Height and Adult-Weight Formulae for the Pakistani Population**  
Jamil N, *MPhil Thesis*, 2009 (unpublished)
- 2008**
- **Validity of Various Techniques of Moiré Fringe Topography**  
Ansari SA, *MPhil Thesis*, 2008 (unpublished)
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Khan MA, *MPhil Thesis*, 2008 (unpublished)
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- **Magnetobiology for Covariant and Generalized-Coupling Models**  
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**Seminars and Presentations**

- February 19, 2011  
*Handout*
- Selected list, related to activities of mathematical biology group:
  - **From Anthropometry to Anthromathematics**  
<http://www.ngds-ku.org/Presentations/Ziauddin.pdf>  
Faculty of Medicine Research Seminar, the Ziauddin University, Clifton Campus, Karachi, Pakistan
- January 24, 2009  
*Event Highlights*  
*Handout*
- **Role of Mathematics in the Clinical Sciences**  
<http://www.ngds-ku.org/Presentations/ICCBS.htm>  
<http://www.ngds-ku.org/Presentations/ICCBS.pdf>  
Seminar, the International Center for Chemical and Biological Sciences (ICCBS), University of Karachi, Karachi, Pakistan
- May 30, 2007
- **The NGDS Pilot Project: A Bioinformatics Perspective**  
Research Seminar, Bahria University, Karachi, Pakistan
- September 21, 2006
- **The NGDS Pilot Project: Growth and Development of Pakistani Children**  
Seminar, Department of Special Education, University of Karachi, Karachi, Pakistan
- March 4, 2006
- **The ICP Model of Child Growth (Concluding Remarks)**  
Seminar, Department of Mathematics, University of Karachi, Karachi, Pakistan
- February 20, 2006  
*Handout*
- **The NGDS Pilot Project: Is Your Child Growing All Right?**  
[http://www.ngds-ku.org/ngds\\_folder/Handout.pdf](http://www.ngds-ku.org/ngds_folder/Handout.pdf)  
Presentation, Beacon Light Academy, Karachi
- October 26, 2005
- **The NGDS Pilot Project: Generating Growth Profiles of Children and Monitoring Spinal Curvatures**  
Seminar, Department of Pediatrics, Dow University of Health Sciences, Karachi, Pakistan
- August 27, 2005
- **The NGDS Pilot Project: Methods to Generate Detailed Growth Profile and Monitor Spinal Curvatures in Children**  
Seminar, Departments of Pediatrics and Orthopedic Surgery, Frontier Medical College, Abbottabad, KP, Pakistan
- July 30, 2005
- **Mathematical Modeling of Growth of Children (Concluding Remarks)**  
Research Seminar, Department of Mathematics, University of Karachi, Karachi, Pakistan
- March 22, 2004
- **The NGDS Pilot Project: Controlling Growth of a Child**  
Seminar, Postgraduate Teaching Program, Department of Pediatrics, the Nishtar Medical College, Multan, Pakistan
- February 7, 2004
- **Covariant-Generalized-Coupling Model of Global Electro cortical Activity**  
Research Seminar, Department of Mathematics, University of Karachi, Karachi, Pakistan
- May 6, 2003
- **The NGDS Pilot Project: Modeling Growth of the Future PAF Officers**  
Seminar, Air War College, PAF Base 'Faisal', Karachi, Pakistan
- March 8, 2003
- **The NGDS Pilot Project: Anthropometry and Growth Modeling of the Pakistani Children**  
Research Seminar, Faculty of Pharmacy, University of Karachi, Karachi, Pakistan
- March 5, 2003
- **The Generalized-Coupling Model of Global Electro cortical Activity**  
Research Seminar, Division of Biological and Biomedical Sciences, the Aga Khan University Medical College, Karachi, Pakistan
- January 22, 2003
- **The NGDS Pilot Project: Anthropometry and Growth Modeling of the Pakistani Children**  
Research Seminar, Division of Biological and Biomedical Sciences, the Aga Khan University Medical College, Karachi, Pakistan
- October 16, 2002
- **The NGDS Pilot Project: Documenting and Modeling Growth of the Future Army Officers**  
Presentation, Army Public School, 'O' Levels, Karachi, Pakistan

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- April 24, 2002 • **The NGDS Pilot Project: Documenting and Modeling Growth of the Pakistani Children**  
Seminar, Postgraduate Teaching Program, Department of Pediatrics, the Aga Khan University Medical College, Karachi, Pakistan
- January 26, 2002 • **The NGDS Pilot Project: Modeling Growth of the Pakistani Children**  
Presentation, PAF (Fazaia) Degree College, Base 'Faisal', Karachi, Pakistan
- December 7, 2001 • **The NGDS Pilot Project: Anthropometry of the Pakistani Children**  
Presentation, Aureole High School, Karachi, Pakistan
- March 7, 1998 • **3-D Optical Imaging and Image Processing: Biomedical Applications**  
MIBM Seminar, Department of Mathematics, University of Karachi, Karachi, Pakistan (coverage in April 1998 issue of the *MEDICINE International*)
- October 21, 1995 • **3-D Optical Imaging and Image Processing**  
MIBM Seminar, Department of Mathematics, University of Karachi, Karachi, Pakistan
- August 3, 1995 • **A Mathematical Model of the Brain**  
MIBM Seminar, Department of Mathematics, University of Karachi, Karachi, Pakistan
- July 3, 1993 • **3-D Optical Imaging: Medical Applications**  
Guest Lecture, the Baqai Medical College, Karachi, Pakistan
- July 11, 1991 • **3-D Optical Imaging: Medical Applications**  
Guest Lecture, the Aga Khan University Medical College, Karachi, Pakistan
- July 16, 1990 • **3-D Optical Imaging**  
Summer Luncheon Seminar, Harvard-MIT Center for Biomedical Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA
- October 1988 • **Medical Applications of Moiré Fringe Topography**  
Participant Talk, College on Medical Physics, ICTP (the Abdus-Salam International Center for Theoretical Physics), Trieste, Italy
- August 21, 1988 • **Moiré Topography**  
Colloquium, Department of Physics, University of Karachi, Karachi, Pakistan
- April 25, 1987 • **Moiré Topography in the Management of Spinal Deformities**  
Guest Lecture, the Aga Khan University Medical College, Karachi, Pakistan
- November 17, 1986 • **Moiré Topography**  
Presentation, Meeting of the Albert Einstein Society, Karachi, Pakistan

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