

Sk. Sarif Hassan

Indian Statistical Institute, Calcutta
West Bengal, Calcutta 700108, India

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sarimif@gmail.com, sarimif@isical.ac.in

Mobile: 09609174055

Education

- **Utkal University** Bhubaneswar, India
Ph.D. in Mathematics (In Progress) 2010 – 2012
 - **Advisors:** Prof. Birendra Kumar Nayak and Prof. Pabitra Pal Choudhury.
 - **Title of Thesis:** *Theory of Fractal Formation and Some Morphological Analysis with Some Novel Applications.*
 - **Place of Entire Research:** *Applied Statistics Unit, Indian Statistical Institute, Calcutta.*
 - **Scheduled Date of Thesis Submission:** *24th June, 2012*
- **Utkal University** Bhubaneswar, India
M.Sc. in Mathematics 2006 – 2008
 - Post Graduated with a 81.25%
 - **Special Papers:** Fractal Geometry, Number Theory & Cryptography and Numerical Analysis.
- **Prabhu Jagatbandhu College, Calcutta University** Calcutta, India
B.Sc in Mathematics (Honours). 2003 – 2006
 - Graduated with a Major in Mathematics and two Minors in Computer Science and Physics.
 - Graduated with Honours, a 49.5%.

Current Area of Research

- – **Broad Research Areas:** Fractal Geometry in Discrete Space, Integral Value Transformations, Cellular Automata, Mathematical Genomics and Mathematical Morphology.
 - *Development of Rudimentary Mathematics of P-adic Integral Value Transformations.*
 - *Discrete Dynamical Systems Structure of one dimensional p-adic IVTs.*
 - *Settlement of Collatz like IVT problems and Their Unified Theory Development.*
 - *Studies on DNA and Protein Sequence Evolution through IVTs.*
 - *A new method of Classification & Analysis of Boolean Functions through SDS.*
 - *Quantitative Description of Human Olfactory Receptors, Pre-mature and Mature Micro RNAs.*

Professional Appointment

- **Indian Statistical Institute, Calcutta** Calcutta, India
Applied Statistics Unit June 2009- March, 2012
 - **Project Research Personnel**
- **Indian Statistical Institute, Calcutta** Calcutta, India
Course in B.Stat June 2009- December, 2009
 - **Teaching Assistant** with Prof. P. Pal Choudhury

– **Subject:** Computational Techniques and Programming-I.

- **Indian Statistical Institute, Calcutta** Calcutta, India
Course in B.Stat *June 2010- December, 2010*
 - **Teaching Assistant** with Prof. P. Pal Choudhury
 - **Subject:** Computational Techniques and Programming-I.
- **Indian Statistical Institute, Calcutta** Calcutta, India
International Statistical Educational Center *June 2011- September, 2011*
 - **Lecturer**
 - **Subject:** Mathematics-I
- **Indian Statistical Institute, Calcutta** Calcutta, India
International Statistical Educational Center *October 2011- December, 2011*
 - **Lecturer**
 - **Subject:** Mathematics-II
- **Prabhu Jagatbandhu College** Calcutta, India
Department of Mathematics *September 2008- June, 2009*
 - **Part-time Lecturer**
 - **Subjects Taught:** Abstract Algebra, Real Analysis, Advance Real Analysis, Complex Analysis, Differential Equations, Game Theory, LPP and Metric Space.

Award

Best Paper Award by DST of Govt. of India, in NMRSMS-2010.

Academic Visits

- **Indian Statistical Institute, Bangalore** Bangalore, India
System Science and Informatics Unit *19th Oct. to 26th Oct, 2010*
 - Course on Mathematical Morphology and Spatial Informatics from 19th Oct. to 26th Oct, 2010.
 - International Workshop Honoring to Prof. Jean Serra from 25th Oct. to 26th Oct. 2010.
- **Indian Institute of Technology, Madras** Chennai, India
Department of Mathematics *11 Nov to 16th Nov. 2010*
 - National Meet of Research Scholars in Mathematical Sciences (NMRSMS 2010).
- **Indian Islamic Cultural Center, Delhi** Delhi, India
International Congress of Mathematicians 2010 *15th Aug to 17th Aug 2010*
 - For Delivering a Contributory Talk in the Satellite Conference of ICM 2010 on Mathematics in Science and technology.
- **Indian Institute of Technology, Delhi** Delhi, India
Department of Mathematics *14 August, 2010*
 - *Workshop on "Inverse Problems and Wavelet with Application to Real World System.*
- **Institute of Mathematics and Applications** Bhubaneswar, India
Department of Mathematics *September, 2009*

– To Deliver a Series of Lectures on Theory of Mathematical Morphology and Fractal in Computational Genomics.

- **Indian Institute of Technology, Roorkee** Roorkee, India
Department of Mathematics December 2010
– National Meet of Research Scholars in Mathematical Sciences (NMRSMS 2009).
- **Institute of Mathematics and Applications** Bhubaneswar, India
Orrisa Mathematical Society March, 2009
– To Deliver a talk in National Conference of Orissa mathematical Society.
- **Harish Chandra Research Institute, Allahabad** Allahabad, India
Summer Programme in Mathematics 2008 June, 2008
– To Attend and Deliver a Seminar Talk on **Cantor Set: As an Official Fractal**.

Supervising Experience

- **Indian Statistical Institute, Calcutta** Calcutta, India
Applied Statistics Unit 2009-2012
– Supervised more than 20 students of Bachelors and Masters students for their Bachelor/Master Thesis.
– **Area of research Works:** Fractal, Mathematical Morphology and Mathematical Genomics, Cellular Automata and Integral Value Transformations.

Publications (available at www.isical.ac.in/hmg/publications)

- 1) P. Pal Choudhury, **Sk. S. Hassan**, S. Sahoo and B. K. Nayak, *Act of CVT and EVT in The Formation of Number Theoretic Fractals*. International Journal of Computational Cognition **9** 1, 83–90 (2011)
- 2) **Sk. S. Hassan**, P. Pal Choudhury, A. Pal, R. L. Brahmachary and Arunava Goswami, *Combination of L-Systems : For Designing Human Olfactory Receptor Pseudo-gene, OR1D3P*. International Journal of Computational Cognition **9** 2, 82–84 (2011)
- 3) **Sk. S. Hassan**, P. Pal Choudhury, A. Pal, R. L. Brahmachary and Arunava Goswami, *Designing Exons for Human Olfactory Receptor Gene Subfamilies Using a Mathematical Paradigm*. Journal of Bioscience **35** 3, 389–393 (2010) **Best Paper in Issue and fetched the position in the Cover Page of the Journal.**
- 4) **Sk. S. Hassan**, P. Pal Choudhury, R. Singh and S. Das, *Collatz Function like Integral Value Transformations*. Alexandria Journal of Mathematics **1** 2, 30–35 **Best Paper Awarded by DST, Govt. of India.**
- 5) P. Pal Choudhury, **Sk. S. Hassan**, S. Sahoo and B. K. Nayak, *Theory of Rule 6 and Its Application to Round Robin Tournament*. International Journal of Computational Cognition **8** 3, 33–37 (2010)
- 6) P. Pal Choudhury, **Sk. S. Hassan**, S. Sahoo and B. K. Nayak, *Carry Value Transformation (CVT): It's Application in Fractal formation*. IEEE 2nd International Advance Computing Conference **978-1-4244-2928-8/09/** 971–976 (2009)

- 7) **Sk. S. Hassan**, P. Pal Choudhury, A. Pal, R. L. Brahmachary and Arunava Goswami, *L-Systems: A Mathematical Paradigm For Designing Full Length Genes And Genomes*. Global Journal of Computer Science and technology **10** 4, 119–122 (2010)
- 8) P. Pal Choudhury, **Sk. S. Hassan**, B. K. Nayak and S. Sahoo, *Theory of Carry Value Transformation (CVT): It's Application in Fractal formation*. Global Journal of Computer Science and technology **10** 14, 89–99 (2010)
- 9) **Sk. S. Hassan**, P. Pal Choudhury, B.S. Daya Sagar, Senior Member,IEEE , S.Chakraborty,R.Guha, and A.Goswami, *Quantitative Description of Genomic Evolution of Olfactory Receptors*. To appear in Scientific Reports, Nature Publishing Group (2012).
- 10) A. Goswami, P. Pal Choudhury, A. Pal, R. L. Brahmachary and **Sk. S. Hassan** it L-Systems: A Mathematical Paradigm for Designing Full Length Human Genes and Genomes. *Genome Biology* **11** 1, 15–15.
- 11) **Sk. S. Hassan**, P. Pal Choudhury, R. Guha, S. Chakraborty and A. Goswami, *DNA Sequence Evolution through Integral Value Transformations*. In Press of Interdisciplinary Sciences: Computational Life Sciences, Springer.
- 12) **Sk. S. Hassan**, A.Roy, P. Pal Choudhury and B.K.Nayak, *One Dimensional p-adic Integral Value Transformations*. Under Review in Applied Mathematics and Computations, Elsevier. (2012)
- 13) **Sk. S. Hassan**, A.Roy, P. Pal Choudhury and B.K.Nayak, *Integral Value Transformations: A Class of Discrete Dynamical Systems*. Under Review in Applied Mathematics Letters, Elsevier. (2012)
- 14) **Sk. S. Hassan**, P. Pal Choudhury, B.K.Nayak, A. Ghosh and J. Banerjee, *Integral Value Transformations: A Class of Discrete Dynamical Systems*. Under Review in Applied Mathematics Letters, Elsevier. (2012)
- 15) A. Ghosh, J. Banerjee, **Sk. S. Hassan** and P. Pal Choudhury, *Fractal String Generation and Its Application in Music Composition*. Under Review in WSEAS Transactions of Mathematics (2012)
- 16) **Sk. S. Hassan** and P. Pal Choudhury, *Proteomics in the Light of Integral Value Transformations*. Nature Precedings [http : //hdl.handle.net/10101/npre.2011.6100.1](http://hdl.handle.net/10101/npre.2011.6100.1)
- 17) **Sk. S. Hassan**, P. Pal Choudhury, A. Goswami and V. Fangal, *Quantification of miRNAs and Their Networks in the light of Integral Value Transformations*. Accepted for publication in PloS ONE (2011)
- 18) **Sk. S. Hassan** and P. Pal Choudhury, *A Spatial Coding Technique for Secure Data Transmission*. Under Review in WSEAS Transactions of Mathematics (2012)
- 19) **Sk. S. Hassan**, P. Pal Choudhury and A. Goswami *Underlying Mathematics in Diversification of Human Olfactory Receptors in Different Loci*. Under Review in Interdisciplinary Sciences: Computational Life Sciences, Springer(2012)
- 20) **Sk. S. Hassan**, P. Pal Choudhury, S. Sahoo and S. Chakraborty, *On the Interesting World of Fractals and Their Applications to Music*. Proceedings of Frontiers of Research on Speech and Music (FRSM 2009), 83-90 (2009)
- 21) P. Pal Choudhury, S.K. Dutta, **Sk. S. Hassan**, and S. Sahoo, *On Universal Physical Reality in the Light of Quantum Consciousness*. International Journal of Computational Cognition, **8**, 3 47–56.

- I have served as reviewer for the following journals:
 - *International Journal of Computational Congnition*
 - *Global Journal of Computer Science and technology*
 - *WSEAS Transactions of Mathematics*
- Creator and maintainer of [www.isical.ac.in/ hmg](http://www.isical.ac.in/hmg), a widely used tool for exploring Mathematical Genomics
January 2009 – present
- Life Member of **Orissa Mathematical Society, Bhubaneswar, India.**
December 2008 – present
- Life Member of **Indian Society of Industrial and Applied Mathematics, India.**
August 2010 – present
- Life Member of **International Association of Engineers, Hong Kong**
January 2011–Present

Technical Skills

- Programming Languages
 - Matlab, C
- Specialized Software
 - **Fractal Analysis Software:** Benoit
 - **Mathematical Morphology Software:** Morph-M

References

- **Professor Pabitra Pal Chodhury**
 - Professor of Computer Science, Applied Statistics Unit, Indian Statistical Institute, Calcutta
 - **Email:** pabitrpalchoudhury@gmail.com; pabitra@isical.ac.in, **Mobile:** 09836612048
- **Prof. Birendra Kumar Nayak**
 - Retired Professor, P. G. Department of Mathematics, Utkal University, Bhubaneswar
 - **Email:** bknatuu@yahoo.co.uk, **Mobile:** 09433479088
- **Dr. Arunava Goswami**
 - Associate Professor, Biological Sciences Division, Indian Statistical Institute, Calcutta
 - **Email:** agoswami@isical.ac.in, **Mobile:** 09433479088
- **Dr. B. S. Daya Sagar**
 - Associate Professor and Head, System Science and Informatics Unit, Indian Statistical Institute, Bangalore
 - **Email:** bsdsagar@isibang.ac.in, **Mobile:** 09880893291