CHANDAN CHAKRABORTY, Ph.D.

Associate Professor

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EDUCATION:

2002-2006: **Ph.D.** *Statistical Pattern Recognition* [IIT KGP]
1999-2001: **M.Sc.** *Applied Statistics & Informatics* [IIT Bombay]
1996-1999: **B.Sc.** *Statistics* [Calcutta University]

PROFESSIONAL EXPERIENCE:

2013-till date: Associate Professor [IIT KGP]
2009-2013: Assistant Professor [IIT KGP]
2007-2009: Senior Lecturer [IIT KGP]

RESEARCH AREAS:

- Digital Pathology
- Medical Image Analysis
- Machine Learning for Medical Imaging
- Smart Diagnostic Method and System

PROFESSIONAL HONORS, AWARDS &FELLOWSHIPS:

- Highly Cited Research Award by Elsevier (2016)
- ICMR International Fellowship for Young Biomedical Scientists (2015)
- BIRAC-SRISTI Gandhian Young Technological Innovation Award (2015)
- Microsoft Academic Excellence Award (2014)
- DAE-Young Scientist Research Award, DAE, Govt. of India (2013)
- IBM-Shared University Research Award, New York, USA (2012 & 2013)
- IBM Faculty Award, New York, USA (2012)
- DST Fast Track Young Scientist Award (2009)
- ISCA Young Scientist Award (2007)

PATENTS:

- Method and system for detection of oral sub-mucous fibrosis using microscopic image analysis of oral biopsy samples [US Patent filed: US2010/0111398A1].
- Method and system for analyzing breast carcinoma using microscopic image analysis of fine needle aspirates [US Patent filed: US2010/0111397A1].
- *PathoQuant:* A portable system for microscopic image acquisition under low-resource framework for histological evaluation [Patent Filed Ref. No.: TEMP/E-1/15578/2017-KOL].

PUBLICATION SUMMARY:

- Journals – **90** Patents – **03** Book Chapters – 13 Conferences – 41
- Citations - 1408 h-index - 22 i10-index - 43
  https://scholar.google.co.in/citations?user=laSEDOEAAAAJ&hl=en

SPONSORED PROJECTS UNDERTAKEN:

• Wound image analysis and informatics	[ICMR]	*Ongoing*
• Breast cancer detection using histopathological image analysis	[MHRD]	*Ongoing*
• Smartphone assisted point-of-care diagnostics	[MHRD]	*Ongoing*
• MR image analysis for Brain glioma detection	[DAE-BRNS]	*Completed*
• Medical Expert System Development for Arrythmia Detection	[DAE-VECC]	*Completed*
• Oral Cancer Detection using Image Processing and Analysis	[Texas Instr]	*Completed*
• Blood pathological image analyzer development	[DeiTY]	*Completed*
• Computer aided retinal image analyser development	[DBT]	*Completed*

- Medical Imaging Informatics [Microsoft Research] *Completed*

CONSULTANCY PROJECTS UNDERTAKEN:

[1] Project Name: Exploring Deep Learning for Screening/Staging of Retinal Diseases using Fundus and OCT Imaging [***Ongoing***]
Client: Carl Zeiss India, Bangalore
Consultant: Prof. Chandan Chakraborty SMST
Grant: 45.0 Lakhs

[2] Project Name: Requirement Specifications for Automated Fundus Image Analytics Algorithms [***Completed***]
Client : Carl Zeiss India, Bangalore
Consultant: Prof. Chandan Chakraborty SMST
Grant: 9.0 Lakhs

DIAGNOSTIC SOFTWARES DEVELOPED:

- Clinical Decision Support System for Malaria Parasite Detection
- Smartphone assisted Anaemia Detection
- Computer Aided Diagnosis for Diabetic Retinopathy Screening using Colour Fundus Images
- Breast Cancer Detection and Grading using Image Analytics Approach

PROFESSIONAL MEMBERSHIPS:

- Life Member : *Indian Science Congress Association (ISCA)*
- Life Member : *Indian Society for Medical Statistics (ISMS)*
- Regular Member : *ACM*
- Regular Member : *IEEE*

INSTITUTIONAL/DEPARTMENTAL ACTIVITIES:

- Assistant Secretary, IEEE Kharagpur Section
- NSS Program Co-ordinator
- Asst. Warded of Hall of Residence: B. R. Ambedkar Hall
- Member of Institute's Mega Project [**Signals and Systems** by MHRD]
- Library in-charge, SMST
- Dept. ERP representative
- Research Scholar Co-coordinator, SMST
- Tabulation in-charge
- Design Syllabus of MTech –Biomedical Engineering programme

PROFESSIONAL ACTIVITIES:

- Convener, **National Workshop on Biostatistics: Applications of Computational Statistics in Medicine & Biology (ACSMB 2011)** during Sept 08-10, 2011 at IIT Kharagpur.
- Organizing Committee, **International Conference on Systems in Medicine and Biology (ICSMB 2010)** at School of Medical Science and Technology, IIT Kharagpur, Dec 16-18, 2010.
- Convener, Short term course on **"Statistics and Pattern Recognition for Automated Disease Diagnostics"** held at School of Medical Science and Technology, IIT Kharagpur, October 05-18, 2010, *(Sponsored by Ministry of Human Resource and Development, MHRD).*
- Convener, Short term course on **"Image Processing and Pattern Recognition for Early Diagnosis of Diseases"** held at School of Medical Science and Technology, IIT Kharagpur, June 6-11, 2009, *(Sponsored by All India Council of Technical Education, AICTE*

COURSES TAUGHT:

Autumn Semester: Biostatistics (PG course – MM 61511)

Quantitative Techniques in Medicine (PG course – MM 61311)

Spring Semester: Pattern Recognition and Machine Intelligence in Medicine (PG course – MM 61504)
Biomedical Image Processing and Interpretation (PG course - MM61503)

RESEARCH GUIDANCE SUMMARY:

- ***Post-Doctoral Fellow:*** 1 completed
- ***PhD Thesis:*** Completed (6 Jt. + 1 Single); Submitted (01 Single); 3 (Ongoing)
- ***MS Thesis:*** 05 Completed
- ***M.Tech. Thesis:*** 15 Completed, 2 Ongoing
- ***B. Tech. Projects:*** 15 Completed, 4 Ongoing

PhD Thesis Guided:

1. Swapna TR. PhD thesis title "***Detecting Diabetic Macular Edema using Fundus Fluroscein Angiogram Image Analysis and Machine Learning***" (Single Guidance) (Completed, 2017).
2. S Sarkar. PhD thesis title "***Analysis for Delay in Wireless Communication for Healthcare Systems***" (Jt. guidance) (Completed, 2017).
3. S Maullick. PhD thesis title "***Health Severity-based QoS Provisioning in Wireless Body Area Networks***" (Jt. guidance) (Completed, 2017).
4. DD Manohar. PhD thesis title "***Computer Assisted Tissue Classification Framework for Chronic Ulcer Evaluation using Optical Imaging***" (Single guidance) (submitted, 2016).
5. R Das. PhD thesis title "***Epithelial Molecular connects for Malignant Potentiality of Oral Sub-mucous Fibrosis***" (Jt. guidance) (Completed, 2014).
6. M. Ghosh. PhD thesis title "***Fuzzy set theoretic approach to microscopic evaluation of chronic myelogenous leukemia***" (Jt. guidance) (Completed, 2012).
7. RJ Martis. PhD thesis "***Electrocardiogram Analysis for Arrhythmia Beat Detection using Machine Learning Techniques***" (Jt. guidance) (Completed, 2012).
8. MR Krishnan. PhD thesis title "***Histopathological Image Analysis and Machine Learning Methods for Detection Oral Submucous Fibrosis***" (Jt. guidance) (Completed, 2011).

PUBLICATIONS:

[A] JOURNAL:

2017 – 2018:

1. M Saha, C Chakraborty, I Arun, R Ahmed, S Chatterjee, An Advanced Deep Learning Approach for Ki-67 Stained Hotspot Detection and Proliferation Rate Scoring for Prognostic Evaluation of Breast Cancer, ***Scientific Reports – (Nature),*** article no. 3213, doi:10.1038/s41598-017-03405-5, (2017).
2. V Rai, R Mukherjee, A Routray, AK Ghosh, S Roy, BPaul Ghosh, PB Mandal, S Bose, C Chakraborty, Serum-based diagnostic prediction of oral submucous fibrosis using FTIR spectrometry, ***Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy***, (Accepted) 2017.
3. DM Dhane, M Maiti, T Mungle, C Bar, A Achar, M Kolekar, C Chakraborty, Fuzzy spectral clustering for automated delineation of chronic wound region using digital images, ***Computers in Biology and Medicine*** **(Elsevier),** Accepted (2017).
4. Computational Approach for Mitotic Cell Detection and its Application in Oral Squamous Cell Carcinoma *by* DK Das, P Mitra, C Chakraborty, S Chatterjee, AK Maiti, S Bose, ***Multidimensional Systems and Signal Processing*** **(Springer)**, Accepted (2017).
5. MRF-ANN: A Machine Learning Approach for Automated ER Scoring of Breast Cancer Immunohistochemical Images *by* T Mungle, S Tewary, DK Das, I Arun, B Basak, S Agarwal, R Ahmed, S Chatterjee, C Chakraborty, ***Journal of Microscopy*** **(Willey)**, Accepted (2017).

6. Imprint Cytology-based Breast Malignancy Screening: An Efficient Nuclei Segmentation Technique *by* M Saha, I Arun, R Ahmed, S Chatterjee, C Chakraborty, ***Journal of Microscopy* (Willey)**, Accepted (2017)
7. Near-set based mucin segmentation in histopathology images for detecting mucinous carcinoma *by* S Banerjee, M Saha, I Arun, B Basak, S Agawal, R Ahmed, S Chatterjee, LB Mahanta, C Chakraborty, ***Journal of Medical Systems* (Springer),** Accepted (2017).

2016 – 2017:

1. AutoIHC-scoring: A machine learning framework for automated Allred scoring of molecular expression in ER and PR stained breast cancer tissue *by* S Tewary, I Arun, R Ahmed, S Chatterjee, C Chakraborty, ***Journal of Microscopy* (Willey)**, Accepted (2017)
2. Textural pattern classification for oral squamous cell carcinoma *by* TY Rahman, LB Mahanta, C Chakraborty, AK Das, JD Sarma, ***Journal of Microscopy* (Willey)**, Accepted (2017).
3. Automated characterization and counting of Ki-67 protein for breast cancer prognosis: A quantitative immunohistochemistry approach *by* T Mungle, S Tewary, I Arun, B Basak, S Agarwal, R Ahmed, S Chatterjee, A K Maity, C Chakraborty, ***Computer Methods & Programs in Biomedicine* (Elsevier),** (2017)139:149-161. doi: 10.1016/j.cmpb.2016.11.002.
4. An Ensemble Rule Learning Approach for Automated Morphological Classification of Erythrocytes *by* M Maity, DD Manohar, C Chakraborty, ***Journal of Medical Systems* (Springer)**, (2017) 41(4):56; DOI 10.1007/s10916-017-0691-x.
5. Computer Assisted Delineation of Cerebral Infarct from Diffusion Weighted MRI using Gaussian Mixture Model *by* MK Nag, S Koley, D China, AK Sadhu, R Balaji, S Ghosh, C Chakraborty, ***Int. J. of Computer Assisted Radiology and Surgery (IJCARS),*** (2017) 12 (4): 539-552.
6. Delineation and diagnosis of brain tumors from post contrast T1-weighted MR images using rough granular computing and random forest *by* S Koley, AK Sadhu, P Mitra, B Chakraborty, C Chakraborty ***Applied Soft Computing* (Elsevier)**, 41:453-465 (2016)
7. Telemedicine supported chronic wound tissue prediction using classification approaches *by* C Chakraborty, B Gupta, SK Ghosh, DK Das, C Chakraborty, ***Journal of Medical Systems* (Springer),** 40:68 (2016).
8. Quantitative microscopic evaluation of mucin areas and its percentage in mucinous carcinoma of the breast using tissue histological images by M Saha, I Arun, B Basak, S Agarwal, R Ahmed, S Chatterjee, R Bhargava, C Chakraborty ***Tissue and Cell* (Elsevier)**, 48(3):265-73 (2016)
9. Multispectral MR Image Fusion for Enhanced Visualization of Meningioma Brain Tumor and Edema Using Contourlet Transform and Fuzzy Statistics by S Koley, A Galande, B Kelkar, AK Sadhu, D Sarkar and C Chakraborty ***J. Medical and Biological Engineering***, 10.1007/s40846-016-0 (2016) [Springer Pub.]
10. Association of Cancer Metabolism Related Proteins in Oral Sub mucous Fibrosis: Potential Biomarkers? Byi V Rai ,R Mukherjee , A Ghosh ,T Bagui , A Routray , A K Ghosh , P B Mandal ,C Chakraborty , ***Journal of Carcinogenesis***, 15 (2016) 193.

2015 – 2016:

1. Spectral clustering for unsupervised segmentation of lower extremity wound beds using optical images by DM Dhane, M Maity, DK Das, C Chakraborty ***Jnl of Medical Systems***, 40(9):207 d (2016) [Springer Pub.]
2. Automated Screening Methodology for Asthma Diagnosis that Ensembles Clinical and Spirometric Information *by* DK Das, C Chakraborty, PS Bhattacharya, ***J. Medical and Biological Engineering***, 36(3):420-429 (2016) [Springer Pub.]
3. Fusion of entropy-based thresholding and active contour model for detection of exudate and optic disk in colour fundus image *by* M Maiti, DD Manohar, DK Das, A Maiti, C Chakraborty, ***J. Medical and Biological Engineering***, 36(6): 795-809 (2016) [Springer Pub.]
4. Nano-scale surface characterization of human erythrocytes by atomic force microscopy: A critical review *by* R Mukherjee, M Saha, A Routray, C Chakraborty ***IEEE Transactions on NanoBioscience***, 14(6):1-9 (2015)
5. Automated system for characterization and classification of malaria-infected stages using light microscopic images of thin blood smears *by* DK Das, AK Maiti, C Chakraborty ***Jnl of Microscopy***, 257(3):238-252 (2015)

6. Performance Analysis of IEEE 802.15.6 MAC Protocol Under Non-ideal Channel Conditions and Saturated Traffic Regime *by* S. Sarkar, S. Misra, B. Bandyopadhyay, and C. Chakraborty ***IEEE Transactions on Computers***, 64 (2015)
7. Feasibility of PET-CT based hypofractionated accelerated dose escalation in oropharyngeal cancers *by* S Chatterjee, Charles Kelly, Moses Arunsingh, C Chakrabarty, Judith Mott ***Jnl of Cancer Research and Therapeutics***, 11(2):391-396 (2015).

2014– 2015:

1. Computational Microscopic Imaging for Malaria Parasite Detection: A Systematic Review *by* DK Das, R Mukherjee, C Chakraborty ***Journal of Microscopy***, 260(1):1-19 (2015)
2. Automated identification of keratinisation and keratin pearl area from in situ oral histological images *by* DK Das, C Chakraborty, S Sawaimoon, AK Maiti, S Chatterjee ***Tissue & Cell***, 47(4):349–358 (2015).
3. A novel segmentation approach for noisy medical images using Intuitionistic fuzzy divergence with neighborhood based membership function *by* A Jati, G Singh, S Koley, A Konar, AK Ray, C Chakraborty ***Journal of Microscopy***, 257(3):187-200 (2015)
4. Automated tissue classification framework for reproducible chronic wound assessment *by* R Mukherjee, DD Manohar, DK Das, A Achar, A Mitra and C Chakraborty ***BioMed Research International***, ID 851582 (2014)
5. Topological features of erythrocytes in thalassemic patients: Quantitative characterization by scanning electron and atomic force microscopy *by* R Mukherjee, K Chaudhury and C Chakraborty ***Analytical Quantitative Cytology and Histology***, 36(2): 91-99 (2014)
6. Automatic leukocyte nucleus segmentation by intuitionistic fuzzy divergence based thresholding *by* A Jati, G Singh, R Mukherjee, M Ghosh, A Konar, C Chakraborty, AK Nagar ***Micron***, 58:55-65 (2014)
7. Magnetic resonance image quality enhancement using transform based hybrid filtering *by* MK Nag, S Koley, C Chakraborty, AK Sadhu ***Advancements of Medical Electronics****, Springer Lecture Notes in Bioengineering*, 39-48 (2015)
8. Histogram based thresholding for automated nucleus segmentation using breast imprint cytology *by* M Saha, S Agarwal, I Arun, R Ahmed, S Chatterjee, P Mitra, C Chakraborty ***Advancements of Medical Electronics****, Springer Lecture Notes in Bioengineering*, 49-57 (2015)

2013 – 2014:

1. Development of hedge operator based fuzzy divergence measure and its application in segmentation of chronic myelogenous leukocytes from microscopic image of peripheral blood smear *by* M Ghosh, C Chakraborty, A Konar, AK Ray ***Micron***, 57:41-65 (2014)
2. Epithelio-mesenchymal transitional attributes in oral sub-mucous fibrosis *by* RK Das, A Anura, M Pal, S Bag, S Majumdar, A Barui, C Chakraborty, AK Ray, S Sengupta, RR Paul, J Chatterjee ***Experimental and Molecular Pathology***, 95(3):259-69 (2013)
3. Application of higher order cumulant features for cardiac health diagnosis using ECG signals *by* R.J. Martis, U.R. Acharya, L.C. Min, K.M. Mandana, A.K. Ray, and C. Chakraborty ***International Journal of Neural Systems***, 23(4) 1350014 (2013)
4. Structural and textural classification of erythrocytes in anaemic cases: A scanning electron microscopic study *by* S Bhowmick, DK Das, AK Maiti, C Chakraborty ***Micron***, 44:384-394 (2013)
5. Synonymous codon usage pattern analysis of Hepatitis D virus *by* Bishal AK, Mukherjee R, Chakraborty C. ***Virus Research***, 173(2):350-353 (2013)
6. Machine learning approach for automated screening of malaria parasite using light microscopic images *by* DK Das, M Ghosh, M Pal, AK Maiti, C Chakraborty ***Micron***, 45:97-106 (2013)
7. Quantitative microscopy approach for shape-based erythrocytes characterization in anaemia *by* DK Das, C Chakraborty, B Mitra, AK Maiti, AK Ray, ***Journal of Microscopy****,* 249(2), 136-149 (2013)

2012 – 2013:

1. Segmentation of Chronic Wound Areas by Clustering Techniques Using Selected Color Space *by* MK Yadav, DD Manohar, G Mukherjee, and C Chakraborty ***J. Med. Imaging Health Inf****.*, 3, 22-29 (2013)

2. Fuzzy expert system approach for coronary artery disease screening using clinical parameters *by* D Pal, KM Mandana, S Pal, D Sarkar and C Chakraborty ***Knowledge-Based Systems***, 36: 162-174 (2012)
3. Cardiac Decision Making Using Higher Order Spectra *by* RJ Martis, UR Acharya, KM Mandana, AK Ray, C Chakraborty ***Biomedical Signal Processing and Control*****,** 8(2)193-203 (2012)
4. Structural characterization of worm images using trace transform and backpropagation neural network *by* C Chakraborty ***Int. Jnl. of Signal Processing, Image Processing and Pattern Recognition***, 5(3):27-48 (2012)
5. A web-accessible framework for automated storage with compression and textural classification of malaria parasite images *by* M Maity, AK Maity, PK Dutta, C Chakraborty ***Int Jnl of Computer Applications***, 52(15): 31-39 (2012)
6. Automated detection of atrial flutter and fibrillation using ECG signals in wavelet framework *by* RJ Martis, H Prasad, C Chakraborty, AK Ray ***J. of Mechanics in Medicine and Biology***, 12(5):12400-423 (2012)
7. Automated screening of arrhythmia using wavelet based machine learning techniques *by* AKR RJ Martis, MM Rama Krishnan, C Chakraborty, S Pal ***Journal of Medical Systems*** 36 (2), 677-688
8. Texture-based leukocyte image retrieval using color normalization and quaternion Fourier transform-based segmentation *by* P Sarkar, M Ghosh, C Chakraborty ***Journal of Network and Innovative Computing***, **1** (2013)

2011 – 2012:

1. Small retinal vessels extraction towards proliferative diabetic retinopathy screening *by* GS Ramlugun, VK Nagarajan, C Chakraborty ***Expert Systems with Applications***, 39(1): 1141-1146 (2012)
2. Automated oral cancer identification using histopathological images: A hybrid feature extraction paradigm *by* MM Rama Krishnan, V Venkatraghavan, U. Rajendra Acharya, M Pal, RR Paul, LC Min, AK Ray, J Chatterjee, C Chakraborty ***Micron***, 43: 352-364 (2012)
3. Hybrid segmentation, characterization and classification of basal cell nuclei from histopathological images of normal oral mucosa and oral submucous fibrosis *by* MRK Mookiah, C Chakraborty, RR Paul and AK Ray ***Expert Systems with Applications***, 39(1): 1062-1077 (2012)
4. Automated Diagnosis of Oral Cancer using Higher Order Spectra features and Local binary pattern: A Comparative Study *by* MRK Mookiah, UR Acharya, C Chakraborty and AK Ray ***Technology in Cancer Research and Treatment***, 10(5):443-55 (2011)
5. Textural characterization of histopathological images for oral sub-mucous fibrosis detection *by* MM Rama Krishna, P Shah, A Choudhary, C Chakraborty, RR.Paul and AK Ray ***Tissue and Cell***, 43(5):318-30 (2011)
6. Texture based segmentation of epithelial layer from oral histological images *by* M. Muthu Rama Krishnan, A Choudhary, C Chakraborty, Ajoy K. Ray, Ranjan R. Paul ***Micron***, 42(6): 632-641 (2011)
7. Quantitative Characterization of Plasmodium vivax in Infected Erythrocytes: a Textural Approach *by* M Ghosh, DK Das, AK Ray, C Chakraborty ***Journal of Artificial Intelligence and Soft Computing***, 3(3) 203-221 (2013)
8. Development of Renyi entropy based fuzzy divergence measure for leukocyte segmentation *by* M Ghosh, DK Das, AK Ray, C Chakraborty ***Journal of Medical Imaging and Health Informatics***, 1(4):1-7 (2011)
9. ApoTome to visualize E-cadherin and p63 expression in oral pre-cancer *by* RK Das, M Pal, A Barui, RR Paul, C Chakraborty, AK Ray, J Chatterjee ***Biotechnology Journal***, 10.1002/biot.2011000 (2011)
10. Application of Principal Component Analysis to ECG Signals for Automated Diagnosis of Cardiac Health *by* Roshan Joy Martis, U Rajendra Acharya, K. M. Mandana, A. K. Ray and Chandan Chakraborty ***Expert Systems With Applications***, 39(14)11792-800 (2012)
11. MMR Krishnan, P Shah, C Chakraborty, AK Ray, Statistical analysis of textural features for improved classification of oral histopathological images, ***Journal of Medical Systems*** 36 (2), 865-881 (2012)

2010 – 2011:

1. Assessment of malignant potential of oral submucous fibrosis through evaluation of p63, E-cadherin and CD105 expression *by* RK Das, M Pal, A Barui, RR Paul, C Chakraborty, AK Ray, S Sengupta, J Chatterjee ***BMJ Clinical Pathology***, 63: 894-899 (2010)
2. Brownian motion curve based textural classification and its application towards cancer diagnosis *by* MM Rama Krishnan, P Shah, C Chakraborty, AK Ray ***Analytical Quantitative Cytology and Histology***, 33(3): 158-168 (2011).

3. Texture based segmentation of epithelial layer from oral histological images *by* M. Muthu Rama Krishnan, A Choudhary, C Chakraborty, Ajoy K. Ray, Ranjan R. Paul ***Micron***, 42(6): 632-641 (2011)
4. Textural characterization of histopathological images for oral sub-mucous fibrosis detection *by* MM Rama Krishna, P Shah, A Choudhary, C Chakraborty, RR.Paul and AK Ray ***Tissue and Cell***, 43(5):318-30 (2011)
5. Automated leukocyte recognition using fuzzy divergence *by* M Ghosh, DK Das, C Chakraborty, AK Ray ***Micron***, 41(7) 840-846 (2010)
6. Arrhythmia disease diagnosis using SVM and Genetic algorithm optimized k-means clustering *by* RJ Martis, C Chakraborty ***Journal of Mechanics in Medicine and Biology***, 11(4): 897-915 (2011)
7. Quantitative analysis of sub-epithelial connective tissue cell population of oral submucous fibrosis *by* MM Rama Krishnan, C Chakraborty, RR Paul, AK Ray ***Journal of Medical Imaging and Health Informatics***, 1(1):4-12 (2011)
8. Knowledge based segmentation and quantitative characterization of basement membrane from histopathological images of oral submucous fibrosis *by* MM Rama Krishnan, V Venkatragavan, Chandan Chakraborty *by* ***Journal of Medical Imaging and Health Informatics***, 1(2): 107-115 (9) (2011)
9. Study of Retinal Biometric Systems with Respect To Feature Classification for Recognition and Diabetic Retinopathy *by* Srikanth Prabhu, Chandan Chakraborty, R, N, Banerjee, A.K. Ray ***Journal of Medical Imaging and Health Informatics***, 1(2): 97-106 (2011)
10. A mirror reflection and aspect ratio invariant approach to object recognition using Fourier descriptor *by* M Agarwal, V Venkatraghavan, C Chakraborty, A. K. Ray ***Applied Soft Computing***, 11: 3910-3915 (2011)
11. Development of Renyi entropy based fuzzy divergence measure for leukocyte segmentation *by* M Ghosh, DK Das, AK Ray, C Chakraborty ***Journal of Medical Imaging and Health Informatics***, 1(4):1-7 (2011)
12. Gaussian Mixture Model–Based Clustering Technique for Electrocardiogram Analysis *by* RJ Martis, C Chakraborty and AK Ray ***Data Mining in Biomedical Imaging, Signaling, and Systems***, 101 - 117 (2011)
13. Wavelet based texture classification of oral histopathological sections *by* MRK Mookiah, C Chakraborty and AK Ray ***Microscopy: Science, Technology, Applications and Education***, **2: 897-906** (2010)
14. Arrhythmia disease diagnosis using neural network, SVM, and genetic algorithm-optimized k-means clustering *by* RJ Martis, C Chakraborty, ***Journal of Mechanics in Medicine and Biology*** **11 (04), 897-915** (2011)
15. Probabilistic prediction of malaria using morphological and textural information *by* D Das, M Ghosh, C Chakraborty, AK Maiti, M Pal, ***Int. Conf. on Image Information Processing*** *(ICIIP)*, **1-6,** (2011)

2009 – 2010:

1. A two-stage mechanism for registration and classification of ECG using Gaussian Mixture Model *by* RJ Martis, C Chakraborty, AK Ray ***Pattern Recognition***, 42 (11) 2979-2988 (2009)
2. CAIDSA: Computer-aided intelligent diagnostic system for bronchial asthma *by* C Chakraborty, T Mitra, A Mukherjee, AK Ray ***Expert Systems with Applications*****,** 36 (3) 4958-4966 (2009)
3. Statistical analysis of mammographic features and its classification using support vector machine *by* MM Rama Krishnan, S Banerjee, C Chakraborty, C Chakraborty, AK Ray ***Expert Systems with Applications***, 37, 470-478 (2010)
4. Automated classification of cells in sub-epithelial connective tissue of oral sub-mucous fibrosis - an SVM based approach *by* MM Krishnan, M Pal, SK Bomminayuni, C Chakraborty, RR Paul, J Chatterjee, AK Ray ***Computers in Biology and Medicine*****,** 39(12)1096-1104 (2009)
5. Structural markers for normal oral mucosa and oral sub-mucous fibrosis *by* MM Rama Krishnan, P Shah, M Pal, C Chakraborty, RR Paul, J Chatterjee, AK Ray ***Micron***, 41, 312-320 (2010)
6. Effect of AEE788 and/or Celecoxib on Colon Cancer Cell Morphology Using Advanced Microscopic Techniques *by* P Venkatesan, S Das, MM Rama Krishnan, C Chakraborty, K Chaudhury, M Mandal ***Micron***, 41, 247-256 (2010)
7. Long-term effects of a carbohydrate-rich diet on fasting blood sugar, lipid profile, and serum insulin values in rural Bengalis *by* S Mukherjee, G Thakur, BD Kumar, A Mitra, C Chakraborty ***Journal of Diabetes***, (1): 288-295 (2009)

2004-2008:

1. Effects of Edible oils in Type 2 Diabetes Mellitus *by* BD Kumar, S Mukherjee, R Pradhan, A Mitra, C Chakraborty ***Journal of Clinical and Diagnostic Research***, 3, 1389-1394 (2009)

2. Luteal Phase Estradiol and FSh Levels: Potential Predictive Markers for successful implantation in IVF/JCSI *by* A Ganesh, SK Goswami, R. Chattopadhyay, S. Ghosh, C. Chakraborty, K. Choudhury, B. N. Chakravarty *Fertility and Sterility*, **91(4):1018-22** (2009)
3. Fuzzy linear and polynomial regression modelling of IF-THEN fuzzy rule base *by* C Chakraborty, D Chakraborty ***Int. Jnl. of Uncertainty, Fuzziness, Knowledge-Based Systems*****,** 16 (2) 219-232 (2008)
4. Cut-off value of reactive oxygen species for predicting semen quality and fertilization outcome *by* S Das, R Chattopadhyay, SK Jana, KN Babu , C Chakraborty, BN Chakravarty, K Chaudhury *Systems Biology in Reproductive Medicine*, 54 pp. 1-8 (2008)
5. A fuzzy clustering methodology for linguistic opinions in group decision making *by* C Chakraborty, D Chakraborty ***Applied Soft Computing***, 7(3) 858-869 (2007)
6. Fuzzy rule base for consumer trustworthiness in Internet marketing: An interactive fuzzy rule classification approach *by* C Chakraborty, D Chakraborty ***Intelligent Data Analysis*****,** 11 (4) 339 - 353 (2007
7. A decision scheme based on ordered weighted average (OWA) operator for an evaluation programme: An approximate reasoning approach *by* C. Chakraborty, D. Chakraborty ***Applied Soft Computing***, 5: 45-43 (2004)
8. A theoretical development on fuzzy distance measure for fuzzy numbers *by* C. Chakraborty, D. Chakraborty ***Mathematical & Computer Modelling*****,** 43 PP 254-261 (2006)
9. A comparative study of fuzzy and neural network approaches to discriminant analysis with linguistic variables *by* C. Chakraborty, D. Chakraborty ***Jnl. of Indian Institute of Science***, 85: 265-277 (2005)
10. Trend analysis of tissue zinc content for medical radiation workers using fuzzy logic *by* D Chakraborty, C. Chakraborty, J Chatterjee, S K Basu, A. K. Das, S. Palchowdhury, S Chakraborty, K Chaudhuri**,** ***Int. J. of Pure and Applied Mathematics***, 28(4) PP 463-476 (2006)

[B] CONFERENCE PUBLICATIONS:

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4. MRK Mookiah, **C Chakraborty** and AK Ray (2011). Wavelet based texture classification of oral histopathological sections. Edited by A. Méndez-Vilas, J. Díaz, ***Microscopy: Science, Technology, Applications and Education***, **Vol 2, Formatex Publishers**, pp. 897-906.

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LAB SET-UP & ACHIEVEMENTS:

- '**BioMedical Imaging Informatics [BMI] Lab'** set up at School of Medical Science and Technology, IIT Kharagpur.
- TWO PhD students have been selected in **Fulbright-Nehru Doctoral Fellowship 2015-2016** at MIT, Boston, USA and **Raman-Charpak Fellowship** 2015-2016 at UPMC, France.
- One PhD fellow has won **TCS fellowship 2016**.
- One MTech has been selected in **DAAD-Sandwitch Fellowship 2015 at TU Munich**, Germany for doing her MTech thesis.