--------------------------------- **Mrityunjoy Chakraborty** --

Professor,
Deptt. of Electronics and Electrical Communication Engg.,
Indian Institute of Technology, Kharagpur
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Qualifications :

- Ph.D. (Indian Institute of Technology, New Delhi, 1994)
- Master of Tech. , (Indian Institute of Technology, Kanpur, 1985)
- Bachelor of Engg. (Jadavpur University, Calcutta, 1983).

Research interests :

- Digital and Statistical Signal Processing

- Adaptive Filters – algorithm, analysis and implementation

- VLSI Signal Processing – bit level and word level architectural optimization for efficiency in power, chip area and throughput.

- Compressive Sensing

- Graph Signal Processing

Experience : Faculty member at the Indian Institute of Technology, Kharagpur since 1994, as,

- *Professor* (since January, 2005 – date)
- *Associate Professor* (Aug., 2000- Dec., 2004)
- *Assistant Professor* (September, 1995-July, 2000)
- *Lecturer* (June, 1994-Aug.,1995)

[Earlier, worked as a faculty member at BITS, Pilani during 1986-87.]

Research / Project Guidance :

- No. of graduate thesis (Ph.D., Masters) guided : Twenty nine
- No. of UG projects guided : Forty eight

Sponsored projects (Last ten years, as PI) :

1. Title : *Advanced Adaptive Filtering for Estimation and Tracking of Sparse Signals and Systems*
   Sponsor :   Ministry of Science and Technology, Govt. of India
   Duration :   36 (+3) months

2. Title :   *Algorithms and Architectures for FPGA based Realization of Wide Open Receivers*

Sponsor :   Defence Electronics Research Lab (DLRL), Hyderabad, Ministry of Defence, Govt. of India.
Duration : 12 months

3. Title :   *Advanced Adaptive Filtering for Sensor Networks and Sparse Systems Applications*
   Sponsor : DST
   Duration :   36 months

4. Title : *Extraction of Radar Signals in the 70-500 MHz band by Suppressing Interfering Communication Signals*
   Sponsor :   Defence Electronics Research Lab (DLRL), Hyderabad, Ministry of Defence, Govt. of India.
   Duration : 12 months

5. Title : *Design of High Speed and/or Low Power Adaptive Decision Feedback Equalizers – an Architectural Optimization Approach*
   Sponsor : Department of Information Technology, Govt. of India
   Duration : 30 months

IEEE Activities (awards, positions held, committee memberships etc) :

1.   Editorial Board

(a) Associate Editor, IEEE Transactions on Circuits and Systems, Part I for 7 years (2004-2007, 2010-2012)
(b) Associate Editor, IEEE Transactions on Circuits and Systems, Part II for 2 years (2008-2009)
(c) Senior Editorial Board Member, IEEE Journal of Emerging Techniques in Circuits and Systems (2016-date)
(d) Senior Editorial Board Member, IEEE Signal Processing Magazine (2016-date)
(e) Editorial board member (as a liaison of the SPS society), IEEE Journal of Computing in Science and Engineering (2014-2018)

2.   Technical Committee (TC)

(a) Chair, DSP TC of the Circuits and Systems (CAS) Society, 2016-2018
(b) Chair-elect, DSP TC of the CAS Society, 2014-2016
(c) Member, DSP TC of the CAS Society, 2010 – date

3.   Technical program committee and related

(a) Track Co-chair, DSP track, IEEE International Symposium on Circuits and Systems (ISCAS) (2015-2018)
(b)Review Committee Member, DSP track, ISCAS (2011-2014)
(c) TPC member, Globecom (2007-2010)
(d) TPC member, International Conference on Communication (2007-2010)

4.   Others

(a) Founder of IEEE Signal Processing Society chapter at Kharagpur, West Bengal, India (2015) and chair of the chapter since inception till date.
(b) Organized special sessions at ISCAS 2011 and 2012.
(c) Regular reviewer of IEEE TCAS I, TCAS II, Transactions on Signal Processing, Signal Processing Letters.
(d) Chairing sessions at ISCAS regularly
(e) Reviewer of IEEE ISCAS and ICASSP.

Major Non-IEEE Activities / Awards/ Recognitions :

1.   Elected fellow of the National Academy of Sciences, India in 2015.
2.   Elected fellow of the Indian National Academy of Engineering in 2010.
3.   Recipient of Japan-Society-for-Promotion-of-Science fellowship.
4.   Recipient of Kyoto University Foundation fellowship.
5.   Was awarded ``Distinguished Lecturership" by the Asia Pacific Signal and Information Processing Association (APSIPA), 2012-2013.
6.   Guest Editor, EURASIP Journal of Advances in Signal Processing.
7.   Fellow, Institution of Electronics and Telecommunication Engineers, India.
8.   Gabor track chair, DSP-15, Singapore.
9.   Co-founder of APSIPA, a society modeled in the line of SPS to promote broad spectrum of research and education activities in signal and information processing
        (www.apsipa.org).
10.   Member, APSIPA board-of-governors, 2013-2016.
11.   Chair, Signal and Information Processing TC, APSIPA, 2010-2012.
12.   Research proposal evaluator, Research Grants Council, Hong Kong
13.   Member, faculty selection committee from overseas, National Chiao Tung University, Taiwan.
14.   General chair (also TPC chair), National Conference on Communication, 2012.
15.   Member, National Board of Accreditation of engineering institutions, India.
16.   Consultant to Defence Research Development Organization, India
17.   Member, faculty selection expert committees at Indian Institutes of Technology
18.   Developed two forty lecture based video and / or web-based courses: ``Probability and Random  Processes" and ``Adaptive Signal Processing" as part of the National Programme on Technology Enhanced Learning (NPTEL), India (available in youtube).
19.   Developed a MOOC course on DSP.
20.   Delivered invited lectures in many top universities in Japan, Korea, Taiwan, Hong Kong, China, Singapore, USA, Canada, Spain, UK and Australia.
21.   Ph.D. thesis examiner, NTU, Singapore.
22.   Expert, University-Grants-Commission, Govt. of India.
23.   Developed two nationally acclaimed one semester long video course (40 lectures each) on ``Wavelets and Multirate DSP" and ``VLSI Digital Signal Processing".

SELECT PUBLICATIONS

A. Journal

[1].   *A Convex Combination of NLMS and ZA-NLMS for Identifying Systems with Variable Sparsity*, Bijit Kumar Das, Vinay Chakravarthi and M. Chakraborty, IEEE Transactions on Circuits and Systems, Part II, (accepted and to appear): DOI 10.1109/TCSII.2017.2651388

[2].   *On the Number of Iterations for Convergence of CoSaMP and Subspace Pursuit Algorithms*, S. Satpathi, and M. Chakraborty, Journal of Applied and Computational Harmonic Analysis, Vol. 43, No. 3, pp. 568-576, November 2017, DOI : 10.1016/j.acha.2016.10.001.

[3].   *Improving the Convergence of the PNLMS Algorithm via L1 Norm Regularization*, R. L. Das and M. Chakraborty, IEEE Trans. Audio, Speech and Language Processing, Vol. 24, No. 7, pp. 1280-1290, July 2016.

[4].   *Sparse Distributed Estimation via Heterogeneous Diffusion Adaptive Networks*, B. K. Das, M. Chakraborty and J. A. Garcia, IEEE Transactions on Circuits and Systems, Part II, Vol. 63, No. 11, pp. 1079-1083, Nov., 2016.

[5].   *On Convergence of Proportionate-Type Normalized Least Mean Square Algorithms*, R. L. Das and M. Chakraborty, IEEE Transactions on Circuits and Systems, Part II, Vol. 62, No. 5, pp. 491-495, May, 2015..

[6].   *Sparse Adaptive Filtering by an Adaptive Convex Combination of the LMS and the ZA-LMS Algorithms*, Bijit Kumar Das and M. Chakraborty, IEEE Transactions on Circuits and Systems, Part I, pp. 1499-1507, May, 2014.

[7].   *Improving the Bound on the RIP Constant in Generalized Orthogonal Matching Pursuit*, S. Satpathi, R. L. Das and M. Chakraborty, IEEE Signal Processing Letters, pp. 1074-1077, Nov., 2013.

[8].   *A Block Floating Point realization of the Adaptive Decision Feedback Equalizer*, R. Shaik and M. Chakraborty, Signal Processing, Elsevier, pp. 1162-1171, May, 2013.

[9].   *A SPT Treatment to the Realization of the Sign-LMS based Adaptive Filters*, S. Chaudhary, P. Mukherjee, M. Chakraborty and S. S. Rath, IEEE Transactions on Circuits and Systems, Part I, pp. 2025-2033, Sept., 2012

[10]. *A New Adaptive Filter for Estimating and Tracking the Delay and the Amplitude of a Sinusoid*, M. Chakraborty, <u>IEEE Transactions on Instrumentation and Measurement</u>, pp. 3049-3057, Nov., 2010.

[11]. *New Adaptive Algorithm for Delay Estimation of Sinusoidal Signals*, M. Chakraborty, H. C. So and J. Zheng, <u>IEEE Signal Processing Letters</u>, pp. 984-987, Dec., 2007

[12]. *An Efficient Implementation of the Sign LMS Algorithm using Block Floating Point Format*, M. Chakraborty, R. Shaik and M. H. Lee, <u>EURASIP Journal on Advances in Signal Processing</u>, January, 2007.

[13]. *A Block-Floating-Point-Based Realization of the Block LMS Algorithm*, M. Chakraborty, R. Shaik and M. H. Lee, <u>IEEE Transactions on Circuits and Syst, Part II</u>, pp. 812-816, September, 2006.

[14]. *A Block Floating-Point Treatment to the LMS Algorithm : Efficient Realization and a Roundoff Error Analysis*, A. Mitra, M. Chakraborty and H. Sakai, <u>IEEE Transactions on Signal Processing</u>, pp. 4536-4544, December, 2005.

[15]. A Trigonometric Formulation of the LMS Algorithm for Realization on Pipelined CORDIC, M. Chakraborty, A. S. Dhar and M. H. Lee, <u>IEEE Transactions on Circuits and Systems, part II</u>, pp. 530-534, September, 2005.

[16]. *A Block Floating-Point Realization of the Gradient Adaptive Lattice Filter*, M. Chakraborty and A. Mitra, <u>IEEE Signal Processing Letters</u>, pp. 265-268, April, 2005.

[17]. *Convergence Analysis of a Complex LMS Algorithm with Tonal Reference Signals*, M. Chakraborty and H. Sakai, <u>IEEE Transactions on Speech and Audio Processing</u>, pp. 286-292, March, 2005.

[18]. *The NLMS Algorithm in Block Floating Point Format*, A. Mitra and M. Chakraborty, <u>IEEE Signal Processing Letters</u>, pp. 301-304, March, 2004.

[19]. *Pipelining the Adaptive Decision Feedback Equalizer with Zero Latency*, M. Chakraborty and S. Pervin, <u>Signal Processing</u>, Elsevier, pp. 2675-2681, December, 2003.

[20]. *A Systolic Array Realization of the Adaptive Decision Feedback Equalizer*, M. Chakraborty and S. Pervin, <u>Signal Processing</u>, pp. 2633-2640, December, 2000.

[21]. *An Efficient Algorithm for Solving General Periodic Toeplitz Systems,* M.Chakraborty, <u>IEEE Transactions on Signal Processing</u>, pp. 784-787, March, 1998.

[22]. *The Role of Statistics in Signal Processing – A Review and Some Emerging Trends*, S. Prasad, M. Chakraborty and H. Parthasarathy, <u>Indian Journal of Pure and Applied Mathematics</u>, June, 1995.

[23]. *Multichannel ARMA Modeling By Least Squares Circular Lattice Filtering*, M. Chakraborty and S. Prasad, <u>IEEE Transactions on Signal Processing</u>, pp. 2304-2318, September, 1994.

[24]. *Computation of a Useful Cramer-Rao Bound for Multichannel ARMA Parameter Estimation*, M. Chakraborty and S. Prasad, <u>IEEE Transactions on Signal Processing</u>, pp. 466-469, February, 1994.

[25]. *Multivariate ARMA Modeling By Scalar Algorithms*, M. Chakraborty and S. Prasad, <u>IEEE Transactions on Signal Processing</u>, pp. 1692-1697, April, 1993.

B. Conference

[1]. *A Block-based Convex Combination of NLMS and ZA-NLMS for Identifying Sparse Systems with Variable Sparsity*, Bijit K. Das and M. Chakrabort, <u>Proc. IEEE International Symposium on Circuits and Systems</u>, Baltimore, USA, May, 2017.

[2]. *A New Diffusion Sparse RLS Algorithm with Improved Convergence Characteristics*, Bijit K. Das and M. Chakrabort, <u>Proc. IEEE International Symposium on Circuits and Systems</u>, Montreal, Canada, May, 2016.

[3]. *Sparse Distributed Learning via Heterogeneous Diffusion Adaptive Networks*, Bijit K. Das, M. Chakraborty and Jeronimo Arenas-Garcia, <u>Proc. IEEE International Symposium on Circuits and Systems</u>, Lisbon, Portugal, May, 2015.

[4]. *A Variable Step-Size Zero Attracting Proportionate Normalized Least Mean Square Algorithm*, Rajib Lochan Das and M. Chakraborty, <u>Proc. IEEE International Symposium on Circuits and Systems</u>, Melbourne, Australia, May, 2014.

[5]. *Sparse Adaptive Filtering by Iterative Hard Thresholding*, Rajib Lochan Das and M. Chakraborty, <u>Proc. APSIPA ASC 2013</u>, Kaohsiung, Taiwan, November, 2013.

[6]. *Sparse Adaptive Filters – an Overview and Some New Results*, Rajib Lochan Das and M. Chakraborty, <u>Proc. IEEE International Symposium on Circuits and Systems</u>, Seoul, South Korea, May, 2012.

[7]. *Gradient Comparator Least Mean Square Algorithm for Identification of Sparse Systems with Variable Sparsity*, Bijit Kumar Das and M. Chakraborty, Proc. APSIPA ASC 2011, Xi'an, China, October, 2011.

[8]. *Adaptive Identification of Sparse Systems with Variable Sparsity*, Bijit Kumar Das, Mrityunjoy Chakraborty and Soumitro Banerjee, Proc. IEEE International Symposium on Circuits and Systems, Rio de Janeiro, May, 2011.

[9]. *A SPT Based Low Complexity Realization of the Weight Update Loop of an Adaptive Filter*, S. Choudhary, P. Mukherjee and M. Chakraborty, Proc. APSIPA ASC 2010, Singapore, December, 2010.

[10]. *A Low Complexity Realization of the Sign-LMS Algorithm,* S. S. Rath and M. Chakraborty, Proc. IEEE International Conference on Green Circuits and Systems, Shanghai, China, June, 2010.

[11]. *A SPT Treatment to the Bit-Serial Realization of the Sign-LMS Based Adaptive Filter*, S. Choudhary, P. Mukherjee and M. Chakraborty, Proc. IEEE International Symposium on Circuits and Systems, Paris, May, 2010.

[12]. *An Algorithm for Bit-Serial Addition of SPT Numbers for Multiplierless Realization of Adaptive Equalizers*, S. Choudhary, P. Mukherjee and M. Chakraborty, Proc. APSIPA ASC 2010, Sapparo, October, 2009.

[13]. *An Efficient Finite Precision Realization of the Block Adaptive Decision Feedback Equalizer*, R. Shaik, M. Chakraborty and S. Chattopadhyaya, Proc. IEEE International Symposium on Circuits and Systems, Seattle, USA, May, 2008.

[14]. *An Efficient, Finite Precision Realization of the Adaptive Decision Feedback Equalize,* R. Shaik and M. Chakraborty, Proc. IEEE International Symposium on Circuits and Systems, New Orleans, USA, May, 2007.

[15]. *An Efficient Realization of the Decision Feedback Equalizer using Block Floating Point Arithmetic*, R. Shaik and M. Chakraborty, Proc. APCCAS 2006, Singapore.

[16]. *The Block LMS Algorithm and its FFT based Fast Implementation - New Efficient Realization using Block Floating Point Arithmetic*, R. Shaik and M. Chakraborty, Proc. EUSIPCO-2006, Florence, Italy, Sept., 2006.

[17]. *The Gradient Adaptive Lattice Algorithm in Block Floating Point Format*, M. Chakraborty and A. Mitra, Proc. IEEE International Conference on Acoustics, Speech and Signal Processing, Montreal, May, 2004

[18]. *Realization of the NLMS based Transversal Adaptive Filter Using Block Floating Point Arithmetic,* A. Mitra and M. Chakraborty, <u>Proc. IEEE International Symposium on Circuits and Systems</u>, Bangkok, May, 2003.

[19]. *An Efficient Block Floating Point Implementation of the LMS Algorithm*, M. Chakraborty, A. Mitra and H. Sakai, <u>Proc. IEEE International Conference on Acoustics, Speech and Signal Processing</u>, HongKong, April, 2003.

[20]. *An Efficient Block Floating Point Implementation of Fixed Coefficient FIR Digital Filter*, A. Mitra and M. Chakraborty, <u>Proc. National Conference On Communications</u>, Bombay, January, 2002.

[21]. *A Hyperbolic LMS Algorithm for CORDIC Based Realization*, M. Chakraborty, S. Pervin, T. S. Lamba, <u>Proc. IEEE Workshop on Statistical Signal Processing-2001</u>, Singapore, August 6-8, 2001.

[22]. *A CORDIC Realization of the Transversal Adaptive Filter Using a Trigonometric LMS Algorithm,* M. Chakraborty, A. S. Dhar, S. Pervin, <u>Proc. IEEE International Conference on Acoustics, Speech and Signal Processing</u>, Salt Lake City, Utah, USA, May, 2001.

[23]. *A Trigonometric Formulation of the LMS Algorithm*, M. Chakraborty, S. Pervin and A. S. Dhar, <u>Proc. of the National Conference On Comunications</u>, Kanpur, India, January, 2001.

[24]. *Systolization of the Adaptive Decision Feedback Equalizer Using a Symbolic State Space Formulation*, M. Chakraborty and S. Pervin, <u>Proc. of EUSIPCO-2000</u>, Tampere, Finland, Sept., 2000.

[25]. *Pipelining the Adaptive Decision Feedback Equalizers with Zero Latency*, M. Chakraborty, S. Pervin and A. S. Dhar, <u>Proc. of the National Conference on Comunications</u>, New Delhi, January, 2000.

[26]. *A Fast Algorithm for Solving Periodically Toeplitz Systems*, M. Chakraborty, <u>Proc. International Symposium on Signal Processing and Applications</u>, Gold Coast, Australia, August, 1996.

[27]. *An Algorithm for Efficient Inversion of Periodic Toeplitz Matrices*, M. Chakraborty, <u>Proc. National Conference on Communications</u>, IIT, Bombay, Feb., 1996.