

Faculty Details

Name: Prof. Sreenivasulu Kurukuti

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Area Of Research: Epigenetic Mechanisms of Gene Regulation During Cellular Differentiation and Disease

Faculty Details

Research Area:

Mechanisms of Gene Regulation During Cellular Differentiation (Neurogenesis and Lactogenesis): All cells of our body harbour identical genetic material i.e DNA. However, all genes are not transcribed in all cell-types but transcribe only a sub-set of them. Cell-type specific gene expression is controlled by genetic and epigenetic mechanisms such as DNA Methylation, Chromatin accessibility, transcription factors, non-coding RNAs and 3-Dimensional spatial organization of genes. We are exploring epigenetic mechanisms of gene regulation in the context of cellular differentiation and its dysregulation in disease context. We use murine embryonic stem cells differentiation into neural progenitors and further into cortical neurons (Neurogenesis) and Lactogenic differentiation of mammary epithelial cells by successive and synergistic action of lactogenic hormones as a model system to explore the systems level understanding of gene regulation. We use cutting edge genomic, epigenomic, bioinformatics and computational tools to address these fundamental questions in Biology

Research Experience:

Professor, Department of Animal Biology, School of Life Sciences, University of Hyderabad, Hyderabad, India (from 2018)

Associate Professor, Department of Animal Biology, School of Life Sciences, University of Hyderabad, Hyderabad, India (2013-18)

Reader, Department of Animal Sciences, University of Hyderabad, Hyderabad, India (2011-13)

Research Associate, Institute of Cancer Sciences, University of Glasgow, Glasgow, United Kingdom. (2008-11)

Postdoctoral Research Scientist, The Babraham Institute, Cambridge, United Kingdom (2005-08)

Postdoctoral Guest Scientist, Department of Development and Evolution, Uppsala University, Uppsala, Sweden (2003-05)

Ph.D. (Zoology), Banaras Hindu University, Varanasi, India (1996-02)

MSc (Biochemistry), SK University, Anantapur, India (1994-96)

BScEd, Chemistry, Botany, Zoology and Education, Regional College of Education, Mysore, India (1990-94)

Notice Board

No Records Available

Students And Project Trainees

Students/Projects Trainees

Name	Joined As	Mail	Contact
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Sharmistha Chaitali	Research Fellow (UoH)	sharmistachaitali.83@gmail.com	---
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Satyanarayana Nadiminti	Junior Research Fellow (CSIR)	satyanarayananadiminti1@gmail.com	---
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Netrika Tiwari	PhD Research Scholar	17laph25@uohyd.ac.in	---
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Sukalpa Mondal	Junior Research fellow	sukalpaq@gmail.com	---
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Rishab G	Junior Research Fellow (ICMR)	gollarishab123@gmail.com	---
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Namreen Khan	DST Inspire Fellow	Namreen R Khan	---
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Former Students/Projects Trainees

Name	Joined As	Working
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Prashanth Kumar Guthikonda	Junior Research Fellow	University of Rochester Department of Biology 434 Hutchison Hall River Campus Rochester, NY, 14627, USA
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Rakhee Nayak	Junior Research Fellow	ETH, Zurich, Switzerland
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Srinivas Kethavath	Junior Research Fellow	Team Lead (Computational Biologist)
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TrinadhaRao Sonrnepudi	Junior Research Fellow	ETH, ZURICH, Switzerland
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Publications

19 Keerthivasan Raanin Chandradoss, Prashanth Kumar Guthikonda, Srinivas Kethavath, Monika Dass, Harpreet Singh, Rakhee Nayak, Sreenivasulu Kurukuti* and Kuljeet Singh Sandhu* (2020) , Biased visibility in Hi-C datasets marks dynamically regulated condensed and decondensed chromatin states genome-wide , BMC Genomics , 21:175,,.

- 18 Chandradoss KR, Chawla B, Dhuppar S, Nayak R, Ramachandran R, Kurukuti S, Mazumder A and Sandhu KS (2020) , CTCF mediated genome architecture regulates the dosage of mitotically stable mono-allelic expression of autosomal genes , Cell Reports , Cell press,33,15,108302 IF - 8.1.
- 17 T Sornapudi, R Nayak, P Guttikona, AK Pasupulati, S Kethavath, V Uppada, S Mondal, S Yellaboina, S Kurukuti (2018) , Comprehensive profiling of transcriptional networks specific for lactogenic differentiation of HC11 mammary epithelial stem-like cells. , Scientific Reports, ,,,.
- 16 Sornapudi TR, Nayak R, Guthikonda PK, Kethaath S, Yellaboina S and Kurukuti S (2018) , RNA sequencing of murine mammary epithelial stem-like cells (Hc11) undergoing lactogenic differentiation and its comparision with embryonic stem cells , BMC Research Notes, ,11,,241.
- 15 Parati sai Arun PV, Miryala SK, Rana A, Kurukuti S, Akhter Y and Yallaboina S (2018) , System-wide coordinates of higher order function in host-pathogen environment upon Mycobacterium tuberculosis infection , Scientific Reports, ,8,,5079.
- 14 Nadella V, Aparna M, Sharma L, Yellubonia S, Balaji MV, Palaparthi P, Madhavi B M, Mourya R, Kurukuti S, Rudel T and Prakash H (2018) , IAP antagonist controls polarization of macrophages during microbial challenge and sterile inflammatory responses , Frontiers in immunology, ,8,,1792.
- 13 Boya R, Yadavalli AD, Nikhat S, Kurukuti S, Palakodeti D and Jagan MR (2017) , Developmentally regulated higher order chromatin interactions orchestrate B cell fate commitment , Nucleic Acids Research, ,45 (19),,11070.
- 12 Zhou Y, Kurukuti S, Saffrey P, Vukovic M, Michie AM, Strogantsev R, West AG and Vetrie D (2013) , Chromatin looping defines expression of TAL1 and its flanking genes and regulation in T- ALL , Blood, ,122(26),,4199.
- 11 7. Sexton T, Kurukuti S, Mitchell JA and Fraser P (2012) , Sensitive detection of chromatin co-associations using enhanced chromosome conformation capture on chip (e4C) , Nature Protocols, ,7(7),,1335.
- 10 Raab JR, Chiu J, Zhu J, Katzman S, Kurukuti S, Wade PA, Haussler D and Kamakaka RT (2012) , Human tRNA genes function as chromatin insulators , EMBO Journal, ,31,,330.
- 9 9. Schoenfelder S, Sexton T, Chakalova L, Cope NF, Horton A, Andrews A, Kurukuti S, Mitchell JA, Umlauf D, Dimitrova DS, Eski CH, Luo Y, Wei CH, Ruan Y, Bieker JJ, and Fraser P (2010) , Preferential associations between co-regulated genes reveal a transcriptional interactome in erythroid cells , Nature Genetics, ,42(1),,53.
- 8 Chakraborty A, Kurukuti S, and Raman R (2009) , Involvement of androgen receptor gene in male gonad differentiation in Indian garden lizard, Calotes versicolor , Molecular and Cellular Endocrinology, ,6(303),,1.
- 7 Sexton T, Umlauf D, Kurukuti S, and Fraser P (2007) , The role of transcription factories in the structure and dynamics of interphase chromatin , Seminars in Cell and Developmental Biology, ,18(5),,691.
- 6 Bergström R, Whitehead J, Kurukuti S, and Ohlsson R (2007) , CTCF regulates asynchronous replication of the imprinted H19/Igf2 domain , Cell Cycle, ,6(4),,450.

- 5 Zhao Z, Tavoosidana G, Sjolinder M, Gondor A, Mariano P, Wang S, Kanduri C, Lexciano M, Sandhu KS, Singh U, Pant V, Tiwari V, Kurukuti S, and Ohlsson R (2006) , Circular chromosome conformation capture (4C) uncovers extensive networks of epigenetically regulated intra and inter-chromosomal interactions , Nature Genetics, ,38(11),,1341.
- 4 Kurukuti S*, Tiwari VK*, Tavoosidana G*, Pugacheva E, Murrell A, Zhao Z, Lobanenko V, Reik W, and Ohlsson R (2006) , CTCF binding at the H19 imprinting control region mediates maternally- inherited higher order chromatin conformation to restrict enhancer access to Igf2 , Proceedings of the National Academy of Sciences U.S.A., ,103(28),,10684.
- 3 Burke LJ, Zhang R, Bartkuhn M, Tiwari VK, Tavoosidana T, Kurukuti S, Weth C, Leers J, Niels, Galjart, Ohlsson R, and Renkawitz R (2005) , CTCF binding and higher order chromatin structure of the H19 locus is maintained in mitotic chromatin , The EMBO Journal, ,24,,3291.
- 2 16. Pant V, Kurukuti S, Pugacheva E, Shamsuddin S, Mariano P, Renkawitz R, Klenova E, Lobanenko V, and Ohlsson R (2004) , Mutation of a single CTCF target site within the H19 imprinting control region leads to loss of Igf2 imprinting and complex patterns of de novo methylation upon maternal inheritance , Molecular and Cellular Biology, ,24(8),,3497.
- 1 Kurukuti S, Ganesh S, and Raman R (2002) , Evolutionarily conserved DMRT1 encodes alternatively spliced transcripts and shows dimorphic expression during gonadal differentiation in the lizard, Calotes versicolor , Mechanisms of Development, ,119S,,S55.

Projects

Title	Year	Duration	Amount(In Lakhs)	PI/I
Epigenetic regulation of gene expression by chromatin supercoiling: Implications in neuronal development and disease	2023	3 Years	62.5	PI
Computational investigation into the role of alternative splicing in cellular differentiation, tissue regeneration and evolution (BT/PR40198/BTIS/137/56/2023)	2023	5 Years	32	Sreenivasulu Kurukuti
Exploring 3-dimensional operons and their spatiotemporal dynamics during cellular differentiation in mammals	2021	3 years	50	Sreenivasulu Kuruti
Development and application of high-resolution genome conformation capture technology to investigate genome architecture in space and time	2018	2 Years	91	Sreenivasulu Kurukuti
Epigenetic mechanisms in embryonic stem cell pluripotency and differentiation	2017	3 Years	48	Sreenivasulu Kurukuti
Spatial transcriptional dynamics of miRNA coding genes in the maintenance of regulated gene expression patterns during cellular development and differentiation	2015	3 Years	90	Sreenivasulu Kurukuti
Computational prioritization and experimental validation of novel regulators required for maintenance of Hematopoietic stem cells. Total budget	2015	3 years	25	Sreenivasulu Kurukuti

Polymorphic dynamics of RNAPII transcriptional nanostructures in Biological system 2014 2 years
10 Sreenivasulu Kurukuti

Development and application of high-resolution chromatin interaction method for characterization of long-range chromatin interactions in the Eukaryotic system 2014 3 Years 25.9 Sreenivasulu Kurukuti

Epigenetic Regulation of Nuclear Geometry: Studies on the existence of Symmetric and Asymmetric Physical Gene Networks in the Mammalian Cell Nucleus 2012 1 year 3 Sreenivasulu Kurukuti

Dynamics of interactions between chromosomes and nuclear envelop 2012 1 year 3 CO-PI

Studies on epigenetic gene regulation during lactation and its impact on milk biosynthesis 2012
3 Years 74.8 Sreenivasulu Kurukuti

Invited Talks

AP state ToT talk on Structural and functional organization of genome

Invited Talk DST CRISPR workshop Epigenetic considerations for genome editing technologies (2023)

DST STRUTI Next generation sequencing technologies. Past present and the future (2023)

Invited Talk All India Cell Biology Conference, Varanasi, India (2023)

Academic Staff College, UoH Hyderabad 2022. Gene regulation in 5-Dimensions

Academic Staff College, UoH Hyderabad 2021 Gene regulation in 4-Dimensions

Academic Staff College, UoH Hyderabad 2020 Gene regulation in 3-Dimensions

International conference on "Phenotypic heterogeneity as a driver of cancer" at IISc Bangalore: Dynamic Mechanistic Breathing of Alternate Hetero and Euchromatic Compartments Accompanies Lactogenic Differentiation of Mouse Mammary Epithelial Cells. 5-9-2020

Academic Staff College, UoH, Hyderabad: Gene regulation in 3rd dimension. 14-11-2019

IIT Gandhinagar: Lamin Dynamics during cellular differentiation. 5-11-2019

BITS Hyderabad. Spatiotemporal Dynamics of 3-D Genome Architecture and Gene Expression during Cellular Differentiation. 2-09-2019

RBVRR Women's College of Pharmacy, Hyderabad: Human Genome and Beyond: Epigenomics in Drug Discovery and Development. 30-08-2019

Gordon Research Conference, Hong Kong: Spatiotemporal Dynamics of 3-D Genome architecture and Gene Expression during Lactogenic Differentiation of Mouse Mammary Epithelial Cells. 3-9 August 2019.

International Conference on Genome Architecture and Cell Fate, University of Hyderabad, Hyderabad: Spatiotemporal Dynamics of 3-D Genome Architecture and Gene Expression during Lactogenic Differentiation of Mouse Mammary Epithelial Cells. 3-6 December 2018.

SBC Conference on Genome Biology and Disease. Manipal Academy of Higher Education, Manipal: Spatiotemporal Dynamics of 3-D Genome Architecture and Gene Expression during Lactogenic Differentiation of Mouse Mammary Epithelial Cells. 25-27 Nov 2018

Amity University, Noida, New Delhi: Signalling and Spatiotemporal Dynamics of 3-D Genome Architecture and Gene Expression during Cellular Differentiation. 19-09-2018.

International workshop on environmental genomics, EPTRI, Hyderabad: Microarray Applications in Environmental Genomics. 25-30 August 2018.

International workshop on environmental genomics, EPTRI, Hyderabad: Next Generation Sequencing Applications in Environmental Genomics. 25-30 August 2018.

Indo US conference on transcription, chromatin structure, DNA repair, and Genome instability, Indian Institute of Sciences, Bangalore. Dynamic reciprocal reorganization of the lamina and inter lamina associated domains accompanies lactogenic differentiation of murine mammary epithelial cells. 6-10, March 2018.

International conference Molecular Signalling (ICMS-2018), School of Life Sciences, University of Hyderabad, Hyderabad, India: Glucocorticoid signalling promotes global remodelling of heterochromatin domains in mammary epithelial cells. 8-10 Feb 2018.

Aspects of gene and cellular regulation, at Institute of Mathematical Sciences, Chennai: Dynamic reorganization of intra-chromosomal domains accompanies signal-induced lactogenic differentiation of mouse mammary epithelial cells. 12-13, Jan 2018.

6th meeting of Asian Forum of Chromosome and Chromatin Biology, CCMB, Hyderabad, India. "Dynamic reorganization of intra and inter chromosome domains accompany lactogenic differentiation of mouse mammary epithelial cells. 3-5, March 2017.

Indian Institute of Technology, Kanpur: Spatiotemporal Dynamics of 3-D Genome Architecture and Gene Expression in Lactogenic Differentiation of Mouse Mammary Epithelial Cells. 10-04-2017

Academic staff college refresher's the program, University of Hyderabad, Hyderabad: Gene regulation in 3rd dimension. 4-12-2017

104th Indian Science Congress, Sri Venkateswara University, Tirupati, AP. Gene Editing Application in Animal Sciences. 3-7 Jan 2017

CTCF meeting, Germany: Analysis of higher-order chromatin organization at mouse H19/Igf2 locus by Chromosome Conformation Capture methodology- CTCF connection. 2014

CTCF meeting, Stockholm, Sweden: Active chromatin hub and epigenetic control of expression domains at mouse H19/ Igf2 locus. (2014)

Invited speaker: CDFD, December 18th, 2016. "Spatio-temporal dynamics of 3-D genome architecture and gene expression during cellular differentiation".

Invited Speaker: 30th Annual Meeting of Society for Neurochemistry India (SNCI). 9-11 December 2016. CCMB, Hyderabad, India

Invited Speaker: Next Gen Genomics, Biology, Bioinformatics and Technologies (NGBT-2016), Cochin, India. "Dynamic reorganization of intra- and inter-chromosomal domains accompanies lactogenic differentiation of mouse mammary epithelial cells.

Invited Speaker: Next-generation sequencing symposium. 4-5 May 2016, CCMB, Hyderabad. Signaling and spatiotemporal dynamics of 3-dimensional genome architecture and gene expression.

Invited speaker: Frontiers in modern biochemistry-From molecules to diseases. 23rd-24th March 2015, Department of Biochemistry, Andhra University, Visakhapatnam. Noncoding RNA regulatory dynamics in cellular differentiation.

Invited Speaker: Transcription assembly meeting. 12th-14th March 2015. IISER Pune, Pune. Prolactin signalling mediated transcriptome dynamics in lactogenic differentiation of mouse mammary epithelial stem cells.

Invited Speaker international conference on frontiers in comparative endocrinology and neurobiology, at School of Life Sciences, University of Hyderabad. Glucocorticoid signalling mediated Transcriptome dynamics in the lactogenic differentiation of mouse mammary epithelial stem cells 25th Nov. 2014

Resource person Academic Staff College, University of Hyderabad on 21st Nov 2014 "Advanced methods in Cell and Molecular Biology".

Keynote lecture "Advanced methods in Cell and Molecular Biology". Chaitanya Bharathi Institute of Technology, Hyderabad, India (2014).

Invited talk "Chromatin architecture in erythroid cells" at 2th Winter Symposium 2014: Haematology: Bench to bedside (2014) Feb 10-12. CMC Vellore. India

Invited Talk "Spatial organization of co-regulated and co-functional genes in the mammalian cell nucleus" at the Central University of Gujarat. Gandhinagar, India

Invited Talk "Spatial organization of genes in the mammalian cell nucleus". Indian Institute of Advanced Research. Ahmedabad, India

Laboratory workshop on epigenetic chromatin modifications (2013) Dec11-16. "Epigenomics methods". Banaras Hindu University, Varanasi, India.

Laboratory workshop on epigenetic chromatin modifications (2013) Dec 11-16. "Gene regulation in 3-dimensions". Banaras Hindu University, Varanasi, India

International Symposium on Karyotype to Haplotype and beyond (2013). December 8-10. Banaras Hindu University, UP, India. "Spatial clustering of co-regulated and co-functional genes in the mammalian cell nucleus.

Indo-German symposium on systems biology (2012) Nov 27-29: Spatial organization of co-regulated and co functional genes in the mammalian cell nucleus.

Epigenetic mechanisms in development and disease meeting, CCMB, Hyderabad, India (2012) Nov 22-24: Transcription-dependent organization of physical gene networks in the mammalian cell nucleus.

IITMadras, Chennai, India (2010): Spatial organization of genes and the genome in the mammalian cell nucleus.

InStem (Institute of Stem cell biology) NCBS (2010): Spatial organization of genes and genome revealed by high throughput chromatin interaction analysis.

IISER Pune, Pune, India (2010): Higher-order organization of genes and the genome in the mammalian cell nucleus.

University of Glasgow, Glasgow, UK, Illumina Talk (2009): 3-dimensional organization of gene networks in the mammalian cell nucleus revealed by high throughput chromatin interaction analysis.

University of Glasgow, Glasgow (2008): Higher order chromatin perspective of gene regulation at mouse H19/Igf2 and beta globin locus.

Genome Institute of Singapore, Singapore (2008): Towards an understanding of the Higher order chromatin perspective of gene regulation in the mammalian genome.

Insulators and chromatin domains, Baeza, Spain (2009): Organization of gene networks in the mammalian cell nucleus revealed by high throughput chromatin interaction analysis.