

Prashanth Ak

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EDUCATION

M.Sc. (Life Sciences), Jawaharlal Nehru University, New Delhi, India

Ph.D. (Neuroscience), New York University (May 2000). *Thesis: Representation of spatial frequency selectivity in the mammalian primary visual cortex.*

OTHER:

Summer school in Nonlinear Dynamics, McGill University

Summer school in Mathematical Methods in Biology, Santa Fe Institute

Visiting fellowship program in Imaging Techniques, Harvard-MGH-NMR

Summer school in Visual Neuroscience, NEC-Princeton University

PROFESSIONAL EXPERIENCE

Postdoctoral Fellow, Genome Center, University of California, Davis (2000 - present)

RESEARCH AND PUBLICATIONS

Strand separation is fundamental to DNA function. My current research involves assessment of energetics governing DNA strand separation under *in vivo* constraints. Rather than merely calculate local duplex destabilization and correlate it with biological function, I collaborate closely with experimental groups of diverse scientific interests to investigate the exact roles of duplex destabilization in a broad range of biological functions where strand separation plays a role. Research areas along with the collaborations are listed below, along with relevant publications and presentations. More detailed descriptions are included in the proposed research plan.

- **DNA structural correlates of genetic diseases.**

Collaboration: Dietmar Lohmann's Group, Institut für Humangenetik, Universitätsklinikum Essen, Germany

P. Albrecht, J. Bode, K. Buiting, Prashanth AK, D. R. Lohmann. Recurrent deletion of a region containing exon 24 of the *RB1*-gene caused by nonhomologous recombination between a LINE-1HS and MER21B element. *J. Med. Genet.* 2004 Dec;41(12):e122

- **Chromatin structure and function. Gene regulation.**

Collaboration: Juergen Bode's Group, German Research Center for Biotechnology/Epigenetic Regulation, Braunschweig, Germany

Martin Klar, Erik Stellamanns, Prashanth AK, Angela Gluch and Juergen Bode. Dominant genomic structures: Detection and signal functions in the interferon beta domain. *To appear in Gene* doi:10.1016/j.gene.2005.07.023

Martin Klar, Erik Stellamanns, Prashanth AK, Craig Benham, and Juergen Bode. Enhanceosome formation over the interferon-beta promoter underlies a remote-control mechanism mediated by YY1 and YY2. *Comparative and Functional Genomics BITS Workshop, Hinxtton, UK 2005*

Martin Klar, Erik Stellamanns, Prashanth AK and Juergen Bode. Dominant genomic structures: Detection and signal functions. *BITS, Chiba, Japan, 2004*

S Götz, S Winkelmann, A Oumard, K Neblsen, M Klar, C Benham, AK Prashanth, HJ Lipps, HH Heng, S Krawetz and J Bode. Chromatin-minidomains: properties, construction and applications. *EMBO:3rd Elmau Conference on Nuclear Organization 2004*

- **Replication origin function in yeast.**

Collaboration: Carol Newlon's Group, Department of Microbiology and Molecular Genetics, UMDNJ-New Jersey Medical School. Bruce Stillman, Cold Spring Harbor Laboratories. Steve Bell's Group, Howard Hughes Medical Institute, MIT, Cambridge Massachusetts

Prashanth Ak and Craig Benham. Susceptibility to superhelicallly Driven DNA Duplex Destabilization: A Highly Conserved Property of Yeast Replication Origins. *PLoS Comput Biol* 1(1): 41-46

Prashanth Ak and Craig Benham. Assessments of duplex destabilization at replication origins. *Gordon Research Conference in Theoretical Biology 2004*

Prashanth Ak and Craig Benham. DNA Duplex Destabilization at Yeast replication origins: Genome-Wide Analysis Reveals A Highly Conserved Property. *Cold Spring Harbor Laboratories, Eukaryotic Replication Origins 2005*

- **DNA structural properties underlying social behavior and rapid evolution.**

Collaboration: Larry Young's Group, Dept. of Psychiatry and Behavioral Sciences, Center for Behavioral Neuroscience, Yerkes National Primate Research Center, Emory University, Atlanta, GA

Prashanth Ak, Zoe Donaldson, and Larry Young. DNA structural properties underlying social behavior. *Annual Meeting of the Society for Neuroscience, Washington DC, 2005*

Elizabeth Hammock, Latif Dharamsi, Prashanth Ak, Larry Young. Regulatory DNA microsatellites as a mechanism generating socio-behavioral diversity. *Annual Meeting of the Society for Neuroscience, Washington DC, 2005.*

- **Mechanisms of retrotransposon insertion in yeast.**

Collaboration: Suzanne Sandmeyer's Group, University of California, Irvine

Prashanth Ak, Suzanne Sandmeyer and Craig Benham. Retrotransposon insertion in yeast occurs preferentially at duplex destabilized sites. *Manuscript submitted.*

Prashanth Ak and Craig Benham. Hotspots for jumping genes. Gordon Research Conference in Theoretical Biology, 2002

- **Gene therapy and retroviral insertions.**

Collaboration: Paul McCray's Group, Program in Gene Therapy, Department of Pediatrics, University of Iowa.

Yubin Kang, Todd E. Scheetz, Christopher J. Moretti, Litao Xie, Diane Thi Tran, Thomas L. Casavant, Prashanth Ak, Beverly L. Davidson, and Paul B. McCray Jr. Integration Site Choice of a Feline Immunodeficiency Virus Vector in Somatic Cells In Vitro and In Vivo. Manuscript under revision.

- **Role of stress induced duplex destabilization in EBV and human replication origin function.**

Collaboration: Aloys Schepers's Group, Department of Gene Vectors, GSF, Marchioninistrasse, Munich, Germany

- **Genome wide analysis of duplex destabilization at regulatory regions in yeast.**

Prashanth Ak and Craig Benham. DNA Duplex Destabilization at Yeast Replication Origins: Genome-Wide Analysis Reveals A Highly Conserved Property. Cold Spring Harbor Laboratories, Biology of Genomes Meeting, 2004

Prashanth Ak and Craig Benham. DNA Duplex Destabilization at Yeast Regulatory Regions: Genome-Wide Analysis Reveals A Highly Conserved Property. Manuscript under review.

- **Role of stress induced duplex destabilization in rapid evolution and speciation.**

Collaboration: New Zealand Plant Species Radiation Group, Alan Wilson Center for Molecular Ecology and Evolution. Massey University, New Zealand

Prashanth Ak Polymorphic genetic mechanisms underlying rapid evolution. Meeting of International Society of Molecular Biology and Evolution, MBE 05 Auckland, New Zealand.

- **Analysis of the ENCODE (ENCyclopedia Of DNA Elements, representing a selected 1% of the Human Genome) region.**

Collaboration: Peggy Farnham's Group, Department of Medical Pharmacology and Toxicology, University of California, Davis. David Levens's Group, NIH. Anindya Dutta's Group, Department of Biochemistry and Molecular Genetics, University of Virginia

- **Chromatin structure and function: Matrix attached regions and replication origins.**

Collaboration: Steve Spiker's Group, Department of Genetics, North Carolina State University and Juergen Bode's Group, German Research Center for Biotechnology/Epigenetic Regulation, Braunschweig, Germany

Jürgen Bode, Silke Winkelmann, Sandra Götz, Steven Spiker, Ken Tsutsui, Chengpeng Bi, Prashanth AK and Craig Benham Correlations Between Scaffold/Matrix Attachment Region (S/MAR) Binding Activity and DNA Duplex Destabilization Energy. *To appear in J. Mol. Biol.*, 2005

- **Analytical methods of large scale datasets**

Everson RM, Prashanth AK, Gabbay M, Knight B, Sirovich L, Kaplan E. Representation of spatial frequency and orientation in the visual cortex. *Proc Natl Acad Sci USA* 1998; 95(14):8334-8.

Prashanth Ak and Ehud Kaplan. Two-pass Principal Components analysis of response of primate visual cortex. *Manuscript under revision.*

Kaplan, Ehud; Prashanth, A. K.; Brennan, Cameron; Sirovich, Lawrence Optical imaging: A review. *Optics & Photonics News, Volume 11, Issue 7, July 2000, pp.26-30.*

TEACHING

- BIM 204, *Physiology for bioengineers* (team taught) UC Davis, Fall 2004 and Fall 2005
- Teaching Faculty at 'Defying Gravity' (NASA Program), 2001, NYC
- Teaching Assistant, NYU, 1993-1995.
- Individual teaching and mentoring: undergraduate (7) and graduate students (3)
- Additional courses on teaching methodology and resources, including at UC Davis (full list available on request)