

Madan Babu Mohan

Personal Details

Address:

National Center for Biotechnology Information (NCBI)
National Institutes of Health (NIH)
Bldg 38A, Room 8S816-E,
8600 Rockville Pike
Bethesda, Maryland 20894, USA

Nationality: Indian

Date of Birth: 14th Nov 1979

Telephone: 1-301-402-9667

Fax: 1-301-480-4637

Email: madanm@ncbi.nlm.nih.gov

madanm@mrc-lmb.cam.ac.uk

<http://www.mrc-lmb.cam.ac.uk/genomes/madanm>

Education and research experience

2005-present:	NCBI, National Institutes of Health, USA	NIH Post-doctoral Visiting Fellowship Sponsored by Dr. L. Aravind <i>"Evolution of biological networks"</i>
2001-2004:	University of Cambridge, MRC-Laboratory of Molecular Biology, UK	PhD Computational Genomics <i>LMB-Cambridge Fellowship, Trinity Honorary External Research Studentship, ORS fellowship</i> Advisor: Dr. Sarah Teichmann <i>"Evolution of transcriptional regulatory networks"</i> Awarded the Max Perutz prize for outstanding research
1997-2001:	Anna University, Center for Biotechnology, Chennai, India	B. Tech Industrial Biotechnology <i>Indian Institute of Science Young Fellowship</i> Final semester project supervised by: Prof. P. Balaram <i>"CH-O Hydrogen bond analysis in protein structures"</i> Awarded the University Gold Medal (CGPA: 9.8/10)
2000: 1999:	Indian Institute of Science, Bangalore, India	Indian Academy of Sciences summer fellowship Supervised by: Prof. P. Balaram <i>"Evolution of TIM barrel proteins"</i> <i>"Molecular modelling of hairpin peptides using NMR derived restraints"</i> Published two manuscripts (JMB & Proteins)
2000: 1999: 1998:	Anna University, Center for Biotechnology, Chennai, India	Research project (after college hours) Supervised by: Prof. K. Sankaran <i>"Evolution and sequence analysis of apyrase"</i> <i>"Study of bacterial lipoproteins"</i> Published two manuscripts (FEBS letters & Bioinformatics)
1997:	Board of Secondary Education, Tamilnadu, India	1153 marks out of 1200 (96.08%) Awarded the National Merit Scholarship
1995:	Board of Matriculation Examination, Tamilnadu, India	1028 marks out of 1100 (93.45%) Secured the 3rd rank in the state and received various awards

Academic Awards (20)

- 1 **NIH Post-doctoral Visiting Fellowship (2005-2007)** - Funding for post doctoral research at the NCBI, USA
- 2 **Max Perutz prize (2004)** - For outstanding research carried out at the MRC Laboratory of Molecular Biology, UK
- 3 **Fellow of the Cambridge Commonwealth Trust (2004)**
- 4 **Visiting Fellowship at the NCBI, NIH (2004, 2003)** - Funding as visiting scientist to work at the NIH
- 5 European Science Foundation, Japanese Society for Promotion of Sciences Fellowship (2003) - To present work and participate in 'Bioinformatics workshop', Spain
- 6 Young Bioinformatician Runners up (2003) - Prize for a competition held in Oxford University, UK
- 7 European Science Foundation Fellowship (2002) - To participate in "Genome to Life" summer school in Corsica", Corsica, France
- 8 DIMACS Student Travel Award (2002) - To present work in DIMACS 2002, Rutgers University, USA
- 9 ISCB Student Award (2002) - To present work in RECOMB 2002, Washington DC, USA
- 10 **LMB-Cambridge Fellowship (2001 – 2004)** - Fellowship to do a PhD at the MRC-LMB, Cambridge University
- 11 **Honorary External Research Studentship (2001-2004)** - Trinity College, Cambridge
- 12 **Cambridge Overseas Research Scholarship (2001-2004)**
- 13 **University Gold Medal (2001)** - For securing the first position in Anna University
- 14 **Indian Institute of Science Young Fellowship (1997-2000)** - To encourage toppers to adopt a career in Science.
- 15 **Indian Academy of Sciences Summer Research Fellowships (1999 and 2000)** - Funding for research work
- 16 **National Merit Scholarship (1997)** - For performance in XII examination
- 17 **Association of Matriculation Schools award** - For securing the 3rd rank in the state
- 18 Nesarathnam Educational Trust - For securing the 3rd rank in the state
- 19 Shield from M.C.T.M HSS - for first in the school and for 3rd rank in the state
- 20 Rotary Club award - For securing the 3rd rank in the state

Presentations / Lectures (32)

2005

- **(Invited)** Special lecture on: Molecular Networks and Systems Biology, [D.G. Vaishnav College, Madras, India](#) – 24th Jan 2005.
- **(Invited)** Insights into the evolution and organization of transcriptional regulatory networks, [Indian Institute of Technology \(IIT\), Madras, India](#) – 20th Jan 2005.
- **(Invited)** Special lecture on: Recent advancements in Biotechnology, [MGR College, Madras, India](#) – 11th Jan 2005.

2004

- **(Invited)** Systems Biology: Structure, evolution and dynamics of transcriptional regulatory networks, [MBU, Indian Institute of Science, Bangalore, India](#) – 29th Dec 2004.
- **(Invited)** Systems Biology: Structure, evolution and dynamics of transcriptional regulatory networks, [National Centre for Biological Science, Bangalore, India](#) – 28th Dec 2004.
- **(Invited)** Transcriptional regulatory networks, [31st annual conference of the Indian Immunological Society, Madras, India](#) – 17th Dec 2004.
- **(Invited)** Networks and Systems Biology, National workshop in Bioinformatics, [Anna University, Madras, India](#) – 11th Dec 2004.
- **(Invited)** Special lecture on systems biology, structure and dynamics of transcriptional regulatory networks, [Alpha College of Arts and Sciences, Madras, India](#) – 7th Dec 2004.
- **(Invited)** Guest lecture on genomics, proteomics and systems biology, National programme in bioinformatics and information technology. [TNVC, Madras, India](#) – 26th Nov 2004.

- **(Invited)** Structure, evolution and dynamics of the yeast transcriptional regulatory network, [Madras University, Madras, India](#) – 24th Nov 2004.
- **(Invited)** Structure, evolution and dynamics of the yeast transcriptional regulatory network, [PSI - University of Zurich, Switzerland](#) – 20th Oct 2004.
- **(Invited)** Structure and evolution of transcriptional regulatory networks in prokaryotes, [MRC Laboratory of Molecular Biology, Cambridge, U.K.](#) - 15th Oct 2004.
- **(Invited)** Non-canonical interactions in protein structures, British Crystallographic Association spring meeting, [Univ. of Manchester, U.K.](#) - 8th Apr 2004.
- **(Invited)** General mechanisms for the evolution of gene regulatory networks, [2nd Trilateral Symposium in Structural Biology, Yokohama City University, Japan](#) - 24th Mar 2004.
- **(Invited)** Structure, Evolution and Dynamics of the gene regulatory network in yeast, [RIKEN Institute, Yokohama, Japan](#) - 23rd Mar 2004.
- **(Invited)** Evolution and dynamics of the gene regulatory network in yeast at [Trinity College, University of Cambridge, U.K.](#) - 12th Feb 2004.

2003

- **(Invited)** Dynamic nature of the gene regulatory network in yeast at the [European Bioinformatics Institute workshop, U.K.](#) - Dec 2003.
- **(Invited)** General mechanisms for the evolution of gene regulatory networks at [Oxford University, U.K.](#) - Oct 2003.
- **(Seminar series)** Mechanisms for the evolution of regulatory networks at the [European Bioinformatics Institute, Hinxton, Cambridge, U.K.](#) - Sep 2003.
- **(Seminar series)** Protein families and the evolution of the gene regulatory network in E. coli at [MRC-LMB, U.K.](#) - Mar 2003.
- **(Invited)** Evolution of the gene regulatory network in E. coli at [Darwin College, University of Cambridge, U.K.](#) - Jan 2003.

2000 - 2002

- **(Invited)** Guest lecture on Biological Databases, Training programme on Bioinformatics & Information Technology at [Bioinformatics Centre & ARIS Cell, Madras Veterinary College, India](#) - Nov 2002.
- **(Invited)** Evolution of transcription factors and the gene regulatory network in prokaryotes at the [University of California, Berkeley, U.S.A.](#) - 20th Sep 2002.
- **(Seminar series)** Evolution of transcription factors and the gene regulatory network in E. coli at [Stanford University, U.S.A.](#) - 19th Sep 2002.
- **(Seminar series)** Protein Families and Regulatory Patterns in the Transcription Factors of E. coli at [MRC-LMB, U.K.](#) - 1st May 2002.
- **(Seminar series)** Regulatory Patterns in the Transcription Factors of E. coli at [NCBI, NIH, Bethesda, Maryland, U.S.A.](#) - 23rd Apr 2002.
- **(Seminar series)** Protein Families in the Transcription Factors of E. coli at [Cornell University, Ithaca, U.S.A.](#) - 12th Apr 2002.
- **(General)** Unix, Telnet and FTP for Beginners at [MRC-Laboratory of Molecular Biology, U.K.](#) Nov 2001.
- **(Invited)** Protein Sequence Analysis and Biological Databases - National workshop on Bioinformatics, [TNVC, Madras, India](#), May 2001.
- **(Invited)** PERL for Biologists – conducted a course (invited) for 3 days at [DSQ Biotech, Bangalore, India](#) during Apr 2001.
- **(Invited)** Introduction to Biological Databases - National workshop on Bioinformatics held in [TNVC, Madras, India](#) during Dec 2000.
- **(Invited)** Co-ordinator and Instructor for the hands on session in the 3 day national workshop on Bioinformatics organized by the Bioinformatics Center at CBT, [Anna University, Madras, India](#) during Nov 24-26, 2000.

Posters Presented (7)

- Genomic analysis reveals a layered structure and dynamic core formation in the molecular interaction networks of yeast – Feb 2005, International Conference on Genes, Evolution and Complex Diseases, NCBS, Bangalore, India. Presented by Seshasayee, ASN - **Best poster prize.**
- Mechanisms for the evolution of regulatory networks – Mar 2004, Trinity College, Cambridge.
- Gene regulatory network growth by duplication - Oct 2003, San Felix, Spain
- Evolution of the gene regulatory network in E. coli by duplication - June 2003, Stockholm, Sweden.
- Protein Families and Regulatory Patterns in the Transcription Factors of E. coli at RECOMB 2002 - Apr 2002, Washington DC, USA.
- Protein Families and Regulatory Patterns in the Transcription Factors of E. coli at DIMACs - Complexity in Biosystems conference - Apr 2002, Rutgers University, USA.
- A Novel C-H...O hydrogen bond stabilized polypeptide chain reversal motif at the C-terminus of helices in proteins - Oct 2001, MRC-LMB, Cambridge.

Refereed manuscript(s) for 10 journals

Nature Genetics, Genome Research, Gene, Trends in Genetics, Trends in Microbiology, Nucleic Acids Research, PEDS letters, FEBS letters, Biological and Medicinal Chemistry, Genome Biology and Bioinformatics.

Featured article(s), News paper article(s), Cover image(s), etc (12)

1. Featured in [Journal of Cell Biology](#), Rewiring the cell - Research roundup
<http://www.jcb.org/cgi/content/full/167/1/14>
2. Featured in [Nature Reviews Genetics](#), Systems biology: Rewiring the network
<http://www.signaling-gateway.org/update/updates/200411/nrg1476.html>
3. Featured in [Science STKE](#), Revealing Transcriptional Network Dynamics
<http://stke.sciencemag.org/cgi/content/abstract/sigtrans;2004/251/tw334>
4. Featured in [Nature AFCS](#), <http://www.signaling-gateway.org/update/library/transcription04.html>
5. Featured in [Faculty of 1000](#), <http://www.f1000biology.com/article/15372033>
6. Featured in [Science News Briefs](#), Systems biology: the flexible network
http://www.world-science.net/ScienceNewsBriefs/stories/040915_network.htm
7. Featured in [Science](#), Editor's choice - Endocytosis at the hub
<http://www.sciencemag.org/content/vol306/issue5699/twil.shtml>
8. Featured in [The Scientist](#), Copies key for gene networks, <http://www.biomedcentral.com/news/20040414/01>
9. Featured in [Biomednet](#), Evolving networks of complexity, <http://news.bmn.com/news/story?day=030227&story=1>
<http://www.bioinformatrix.com/net/modules.php?name=News&file=article&sid=46>
10. Featured in [The Hindu](#) - India's National Newspaper,
This young scientist sets his sight on prevention of diseases
<http://www.hindu.com/2005/01/03/stories/2005010303331300.htm>
11. Featured in the International [Society for Computational Biology](#) Newsletter
Student Travel Fellowships: RECOMB2002
<http://www.iscb.org/newsletter5-2/fellowship.html>
12. Cover image in [Current Opinions in Structural Biology](#) and [EMBO Journal](#)

Publications (2 invited book chapters + 20 journal publications)

Invited Book chapters

1. **Madan Babu, M.*** (2004) Introduction to Microarray Data Analysis, [chapter in Computational Genomics](#), Horizon press (Grant, R. Editor).
2. Seshasayee, A.S.N. and **Madan Babu, M.***. (2005) Contextual inference of protein function, [chapter in Encyclopaedia of Genomics, Proteomics and Bioinformatics](#), John Wiley & Sons, (Subramanian, S. Editor), in press.

Journal publications (* indicates corresponding author & ¹ indicates joint first author)

2005 (5)

3. **Madan Babu, M.***, Teichmann, S. A. and Aravind, L.* (2005). Genomic analysis reveals rapid evolution of transcriptional regulatory networks in prokaryotes, [revision requested in Science](#).
4. Balaji, S., **Madan Babu, M.**, Iyer, L.M., Aravind, L. (2005). Discovery of the principal specific transcription factors of Apicomplexa and their implication for the evolution of the AP2-integrase DNA binding domains, [Nucleic Acids Research, in press](#).
5. Eichinger, L. et. al., (2005). The genome of the social amoeba *Dictyostelium discoideum*, [Nature](#), 435(7038):43-57.
6. Aravind, L., Anantharaman, V., Balaji, S., **Madan Babu, M.**, Iyer, L.M. (2005). The many faces of Helix-Turn-Helix domain: transcription regulation and beyond, [FEMS Microbiology Reviews](#), 29(2):231-62.
7. Nye, T., Berzuini, C., Gilks, W., **Madan Babu, M.**, and Teichmann, S.A. (2005) Statistical analysis of domains in interacting protein pairs, [Bioinformatics](#), 21(7):993-1001.

2004 (5)

8. **Madan Babu, M.^{1*}**, Luscombe, N.¹, Aravind, L., Gerstein, M., Teichmann, S.A.* (2004). Structure and evolution of gene regulatory networks. [Current Opinion in Structural Biology](#), 14(3):283-91.
9. Luscombe, N.^{1*}, **Madan Babu, M.^{1*}**, Yu, H., Snyder, M., Teichmann, S. A.* and Gerstein, M.* (2004). Genomic analysis of regulatory network dynamics reveals large topological changes, [Nature](#), 431:308-12.
10. Teichmann, S. A.* and **Madan Babu, M.*** (2004). Gene regulatory network growth by duplication, [Nature Genetics](#), 36(5):492-6.
11. Luscombe, N.* and **Madan Babu, M.*** (2004) Gene expression analysis using the hexamer-based universal microarray (research update), [Trends in Biotechnology](#), 22:552-5.
12. Praefcke, G.J.K., Ford, M.G.J., Schmid, E.M., Olesen, L.E., Gallop, J., Chew, S.Y., Vallis, Y., **Madan Babu, M.**, Mills, G. and McMahon, H.T. (2004). Clathrin-coated pit assembly: The AP2 complex serves as an integration hub to order the dynamic network of accessory proteins, [EMBO Journal](#), 23(22):4371-83

2003 (4)

13. **Madan Babu, M.*** and Teichmann, S. A. (2003). Evolution of transcription factors and the gene regulatory network in *Escherichia coli*, [Nucleic Acids Research](#), 31(4):1234-1244.
14. **Madan Babu, M.*** and Teichmann, S. A. (2003). Functional determinants of transcription factors in *Escherichia coli*: protein families and binding sites, [Trends in Genetics](#), 19(2):75-79.

15. **Madan Babu, M.*** (2003) Did the loss of sigma factors initiate pseudogene accumulation in *M. leprae*?, **Trends in Microbiology**, 11(2):59-61.

16. **Madan Babu, M.*** (2003) NCI: a server to identify non canonical interactions in protein structures, **Nucleic Acids Research**, 31(13), 3345-8.

2001-2002 (6)

17. Teichmann, S. A. and **Madan Babu, M.** (2002). Conservation of gene co-regulation in prokaryotes and eukaryotes, **Trends in Biotechnology**, 20(10):407-410.

18. **Madan Babu, M.**, Singh, S.K. and Balaram, P. (2002). A C-H...O hydrogen bond stabilized polypeptide chain reversal motif at the C terminus of helices in proteins, **Journal of Molecular Biology**, 322(4):871-880.

19. Singh, S.K., **Madan Babu, M.** and Balaram, P. (2002) Registering alpha-helices and beta-strands using backbone C-H...O interactions, **Proteins: structure function and genetics**, 51(2):167-171.

20. **Madan Babu, M.** and Sankaran, K. (2002). DOLOP - a database of bacterial lipoproteins, **Bioinformatics**, 18(4):641-643.

21. **Madan Babu, M.**, Kamalakkannan, S., Subrahmanyam, Y.V.B.K. and Sankaran, K. (2002) Shigella apyrase - a novel variant of bacterial acid phosphatases? - **FEBS Letters**, 512(1-3):8-12.

22. **Madan Babu, M.***, Bhargavi, J., Singh, R. S. and Singh, S. K. (2001) Virulence factors of *Bordetella pertussis*, **Current Science**, 80(12):1512-1522.

Manuscript(s) submitted:

23. **Madan Babu, M.^{1,*}**, Leena Priya, M.¹, Tamil Selvan, A., Madera, M., Gough, J. and Sankaran, K.* (2005). An updated version of DOLOP with functional assignments to predicted lipoproteins, **submitted to Journal of Bacteriology**.

24. **Carninci, P** et. al., The Transcriptional Landscape of the Mammalian Genome, **submitted to Science**.

25. Aravind, L., **Madan Babu, M.**, Iyer, L.M., VRR-Nuc: A novel family of restriction endonuclease fold proteins with a role in viral replication and cellular DNA repair, **submitted to PLoS Computational Biology**.

Referees

1. Sarah Teichmann, PhD (Thesis advisor)

Group Leader, Structural Studies Division, Medical Research Council -Laboratory of Molecular Biology, Hills Road, Cambridge CB2 2QH, UK.

Phone: 44-1223-252947, Fax: 44-1223-213556, Email: sat@mrc-lmb.cam.ac.uk

2. L. Aravind, PhD

Investigator, National Center for Biotechnology Information (NCBI), National Library of Medicine (NLM), National Institutes of Health (NIH), Bldg. 38A, Room 5N505, 8600 Rockville Pike, Bethesda, MD 20894, USA

Phone: 1-301-594-2445, Fax: 1-301-435-7794 or 1-301-480-9241, Email: aravind@ncbi.nlm.nih.gov

3. Uri Alon, PhD

Senior Investigator, Department of Molecular Cell Biology, Weizmann Institute of Science, Rehovot, Israel.

Phone: 972-8-9344448, Fax: 972-8-9344125, Email: urialon@weizmann.ac.il