

**Work Address**

Room No - 102, Dept. of CSE,  
IIT Kharagpur:721302, India.  
krish@cse.iitkgp.ernet.in

**Home Address**

128/N Kalipada Mukherjee Road  
Calcutta:700008, India.  
c.krishnendu@yahoo.com

# Krishnendu Chatterjee

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**Research Interests**      Programming Systems and Languages(Formal Verification)  
Algorithms Design and Analysis  
Artificial Intelligence

**Research & Training Experience**      RESEARCH CONSULTANT      **Department of Computer Science and Engineering,  
IIT Kharagpur, India.**  
June 2001 - Present

**Model Abstraction and Formal Verification<sup>1</sup>**

**Principal Investigator: Prof. P.P.Chakrabarti and Dr. Pallab Dasgupta**

In this project we have worked on the problem of evaluating extremal timing properties of a Open System. In a open system ( or a Timed Module) there are states which are environment states and the environment can behave in any arbitrary way. We have identified a polynomially verifiable fragment of Min-max CTL ( a logic to reason about extremal timing properties of Closed systems) while retaining most of its expressive power.

B.TECH SENIOR YEAR      **Department of Computer Science and Engineering,  
IIT Kharagpur, India.**  
August 2000 - May 2001

**Weighted Quantified Computation Tree Logic : BTech Final Yr Dissertation**

**Project Guide: Prof. P.P.Chakrabarti and Dr. Pallab Dasgupta**

In this project we have extended the syntax of CTL with first order quantification over states and enhanced its expressibility. We have extended this logic on Timed Model to reason about the extremal behavior of the systems. The proposed logic can be used for evaluation of several practical and interesting queries of planning as well as of verification. It provides an unified platform to reason about problems in diverse domains exploring the basic common elements in planning and verification. All the query expressed in our logic takes polynomial time in size of the system and query length to be evaluated. Hence it is a very efficient logic to reason about the extremal properties .

WORKSHOP ON UMS ARCHITECTURE      **Cradle Technologies Inc.,  
Pune, India.**  
October 2001

**Universal MicroSystem's (UMS) Parallel Architecture Processor<sup>2</sup>**

-Familiarization with the UMS parallel architecture microprocessor, and its unique stream processing capabilities, an MPEG decoder being taken for case study.

-Hands on programming experience with the UMS Simulator in Assembly, C and CLASM (C Like Assembly - An effective programming approach adopted by UMS).

SUMMER INTERNSHIP      **IBM, India Research Laboratory,New Delhi, India.**  
May 2000 - July 2000

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<sup>1</sup>Funded by SUN Microsystems, USA

<sup>2</sup><http://www.cradle.com/ums/index.html>

## Remote Authentication Using Finger-prints

**Project Guide: Dr. Pradeep Dubey and Dr. Vijay Kumar**

In this project the objective was to develop a protocol for secure remote authentication using fingerprints, such that any eavesdropper with all the information exchanged during authentication will not be able to impersonate. The knowledge gained by the eavesdropper hearing entire authentication sessions does not help him to falsely prove his identity to the verifier, but the true prover can prove his identity with his finger-prints.

**Education**      **Bachelor of Technology (B.Tech, Hons.) in Computer Science and Engineering (2001)**

Department of Computer science and Engineering,  
Indian Institute of Technology (IIT) - Kharagpur, India.

**CGPA : 9.68 / 10.00**, on an absolute scale(highest in the Institute).

**Talks  
Presented**

- **Linux Vs. Windows NT**  
at IIT Kharagpur
- **SDL and Concurrent Systems in SDL**  
at IIT Kharagpur
- **Remote Authentication Using Finger Prints**  
at **IBM India Research Lab** New Delhi
- **Gigabit Ethernet**  
at IIT Kharagpur
- **$\lambda$  Calculus and Recursive Function Theory**  
at IIT Kharagpur
- **Kolmogorov Complexity and its Applications**  
at IIT Kharagpur
- **Mu Calculus and Model Checking**  
at IIT Kharagpur
- **Algorithmic Analysis of Hybrid Systems**  
at IIT Kharagpur
- **Weighted Quantified Computation Tree Logic**  
at the International Conference on Information Technology (CIT-2001)
- **Points of Good Teaching**  
at Seminar on Teaching and Evaluation  
Centre of Educational Technology, IIT, Kharagpur

**Term  
Papers**

- **Linux Vs. Windows NT**
- **Gigabit Ethernet**
- **Role of Money in Economics**

**Patents**

- **IBM Invention Disclosure**, “ Remote Authentication Using Finger Prints ”

**Publications**

- **Weighted Quantified Computation Tree Logic**  
Krishnendu Chatterjee, P P Chakrabarti, Pallab Dasgupta  
*International Conference on Information Technology, 2001(CIT-2001)*(published)
- **Implementation of Shape Grammar for Plan Analysis**  
Sanhita Mallick, Krishnendu Chatterjee, Arif. N. Merchant, Pallab Dasgupta  
*International Conference on Information Technology for Built Environment (IT- Built -2002)*(published)

- **A Branching Time Temporal Framework For Quantitative Reasoning**  
Krishnendu Chatterjee, P.P. Chakrabarti, Pallab Dasgupta  
*Journal of Automated Reasoning (JAR)*(submitted)
- **Min-max Timing Analysis of Open Systems**  
Pallab Dasgupta, P.P. Chakrabarti, Krishnendu Chatterjee, J.K. Deka  
*ACM Transactions on Computation Logic(TOCL)* ( submitted )

**Academic Achievements**

- Has been consistently the **Department topper**. Has topped the class in 4th, 5th, 6th, 7th and 8th semester. Winner of the **Institute Silver Medal** for the academic year 2000-2001 for being adjudged the *best student* in order of merit among students graduating with B.Tech(Hons). degree in Computer Science and Engineering.
- Won the prestigious *Endowment Prize: Charubala Devi Memorial* for the academic year 1999-2000 for being adjudged the best student in *order of merit* in the Third Year classes among students of all B.Tech(Hons) courses.
- Won the **Best Outgoing Academician** of R.K Hall of Residence for the best Academic performance among the hall residents from the class of 2001.
- Won the **Proficiency Award** for the *Best Project Work*(Senior Year Project) among all successful students gradating in 2000-2001 in the B.Tech(Hons) course in Computer Science and Engineering. The Project has been selected by the Institute to participate in the **Young Inventors Award** organized by *Far Eastern Economic Review* and *Hewlett Packard*.
- Has been the **Institute Topper** from the 4th semester onwards and the winner of **President of India Gold Medal** (most prestigious academic award in IIT) in the batch of 2001 for being the best student *in order of merit* among students of all B.Tech(Hons) and B.Arch courses.
- Reciepent of Fellowship Offers for PhD programs from all US Schools applied for which includes **Stanford University, University of California Berkeley, Carnegie Mellon University, Cornell University and University of Texas at Austin**

**Other Achievements**

- Was the **Think Tank Group Head** of *Bitwise2k++* ( the Algorithm Intensive Programming Contest ) organized by the Department of Computer Science and Engineering, IIT Kharagpur.

**References**

Professor P. P. Chakraborti,  
Department of Comp. Science & Engineering,  
IIT Kharagpur  
ppchak@cse.iitkgp.ernet.in

Dr. Pallab Dasgupta,  
Department of Comp. Science & Engineering,  
IIT Kharagpur  
pallab@cse.iitkgp.ernet.in