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*Industrial and Enterprise Systems Engineering  
University of Illinois at Urbana-Champaign  
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**RESEARCH INTERESTS**

Genetic algorithms, multiscale modeling in materials science and chemistry, principled efficiency enhancement, large-scale optimization, stochastic optimization, machine learning.

**EDUCATION**

**PhD in Systems and Entrepreneurial Engineering**, [University of Illinois at Urbana-Champaign](#), Urbana IL, anticipated graduation date: October 2007.

*Dissertation Title:* “Genetic algorithms and genetic programming for multiscale materials modeling: Applications and advances in scalability.”

*Thesis Advisors:* [David E. Goldberg](#) and [Duane D. Johnson](#).

**MS in General Engineering**, [University of Illinois at Urbana-Champaign](#), Urbana IL, 2002.

*Thesis Title:* “Evaluation relaxation schemes in genetic and evolutionary Algorithms.”

*Thesis Advisor:* [David E. Goldberg](#).

**MSc (Hons) in Chemistry and ME in Chemical Engineering**, [Birla Institute of Technology and Science](#), Pilani, INDIA, 1999.

*Thesis Advisor:* I. J. Nagrath.

**RESEARCH EXPERIENCE**

**Graduate Research Assistant: Jan 2000 - present**

*Illinois Genetic Algorithms Laboratory, University of Illinois at Urbana-Champaign, IL.*

- Research on the analysis, design and development of *competent* and *efficient* genetic algorithms and genetic programming with particular application to search, optimization, and machine learning problems in materials science and chemistry, especially in the field of multiscale materials modeling.
- Developed *evaluation-relaxation* schemes and other principled *efficiency-enhancement* methods that yield *super-multiplicative* speedups for genetic algorithms and other optimization methods.
- Implemented a SIMD-based fully-parallelized efficient genetic algorithm that could solve very large scale problems with up to **32 million** variables to full convergence, and **over**

a **billion** variables to relaxed convergence (Altivec for IBM powerpc, SSE for Intel and AMD processors, MPI, C/C++).

- Derived population-sizing and scalability models for genetic programming.
- Integrated genetic algorithms—both serial and parallel versions—with FOX, an automated army course of action tool-box (C++, MPI).
- Developed a generic optimization tool-box specifically tailored for cooling-system design optimization for Caterpillar (C++, Matlab). Conducted an exhaustive analysis of the behavior of simple genetic algorithms in the design of simple cooling systems.

**Graduate Research Assistant: Jan 2000 - present**

*Materials Computation Center, University of Illinois at Urbana-Champaign, IL.*

- Developed a multiscaling approach for *fast* and *accurate* quantum-chemistry simulations. Used multiobjective genetic algorithms for optimizing parameters for semiempirical methods using limited *ab initio* and experimental data.
- Developed a multiscaling approach for materials kinetics simulation. Used genetic programming for symbolically regressing an *inline barrier-energy function* to bridge kinetic Monte Carlo and molecular dynamics.

**Graduate Research Assistant: Jan 1999 - Dec 1999**

*Department of Chemical Engineering, State University of New York at Buffalo, NY.*

Non-linear optimization (MINOS, GAMS, NPSOL) of hybrid power cycles.

**Project Assistant: Jul 1996 - Jul 1998**

*Center for Robotics and Intelligent Systems, Birla Institute of Technology and Science, Pilani.*

- Developed a genetic algorithms and fuzzy-logic based pH control system (C).
- Developed a solution manual for a widely used textbook: *Control Systems* by I. J. Nagrath (Matlab).

## TEACHING EXPERIENCE

**Graduate Teaching Assistant: Jan 2006 - May 2006**

*Industrial and Enterprise Systems Engineering, University of Illinois at Urbana-Champaign.*

Graded homework, projects, and exams, handled problem and project sessions, and held office hours for the undergraduate course *Analytical Methods for Uncertainty/Analysis of Data* (GE 331/IE 300).

**Teaching Assistant: Aug 1998 - Dec 1998**

*Birla Institute of Technology & Science, Pilani.*

Handled the laboratory for process control course (senior-level course).

## PROFESSIONAL EXPERIENCE

### Consultant: Sep 2004 - present

*Nextumi Inc., Enterprise Works, Champaign IL.*

Nextumi is a web 2.0 company that simplifies sharing of photos, videos, and other contents and contacts among people across different devices. As one of the first employees of Nextumi, Set up the research group and facilities, hired and supervised programmers and web designers, and planned and coordinated projects for the proof-of-concept prototype. Instrumental in design and development of innovations including the core technology of Nextumi. Currently, coordinating research efforts including projects related to the upcoming alpha and beta releases.

### Consultant: Aug 2002 - Jan 2004

*Schema Inc., New Jersey. Schema LTD, Herzlia, Israel.*

Schema is a leading solution provider to wireless optimization problems. Consulted on competent and efficient genetic and evolutionary algorithms for practical solutions to wireless search and optimization problems. Invented new recombination and mutation operators that sped up GAs by a factor of 30–50 and improved solution quality by factor of 2–5.

### Summer Trainee: May 1995 - Jul 1995

*Indira Gandhi Center for Atomic Research, Kalpakkam, India.*

Developed a Model of Crossflow Ultrafiltration for the removal of Uranium from radioactive waste (C, Matlab).

## ADMINISTRATIVE EXPERIENCE

### Student Lab Director: Aug 2002 - present

*Illinois Genetic Algorithms Laboratory, University of Illinois at Urbana-Champaign, IL.*

Managing daily operation of Illinois genetic algorithms laboratory. Interacting with graduate students, visiting scholars and professors, and industrial contacts on a regular basis. Designed and led the assembling and upgrading efforts of a 93-node diskless PC cluster. Responsible for regular upgrading, and maintaining of the cluster, workstations, and servers. Coordinating and supervising system- and web- administrators, and librarian.

### Student team leader: Jan 2001 - Aug 2001

*Illinois Genetic Algorithms Laboratory, University of Illinois at Urbana-Champaign, IL.*

Led a team of 7 that developed advanced cooling system design-optimization tool-box for Caterpillar. Developed a GUI-based application-independent advanced genetic algorithm tool-box which included advanced features such as niching methods, multiobjective operators, and local-search methods (C++).

## AWARDS & GRANTS

- **Bbest paper award** (with D. E. Goldberg and X. Llorà), estimation of distribution algorithms track, [Genetic and Evolutionary Computation Conference](#), 2007.
- **Bronze “Humies” award** (with J. Bacardit, M. Stout, J. D. Hirst, X. Llorà, and N. Krasnogor), [Human Competitive Results](#) at the [Genetic and Evolutionary Computation Conference](#) (ACM SIG conference), 2007.
- **Nominated for best paper award** (with M. Pelikan and D. E. Goldberg), genetic algorithms track, [Genetic and Evolutionary Computation Conference](#), 2007.
- **Nominated for best paper award** (with T.-L. Yu, M. Pelikan and D. E. Goldberg), estimation of distribution algorithms track, [Genetic and Evolutionary Computation Conference](#), 2007.
- **Finalist, Lemelson-Illinois student prize.** [Annual award for the most inventive student](#) at the University of Illinois, 2007.
- **Silver “Humies” award** (with D.D. Johnson, A. L. Thompson, D. E. Goldberg, T. J. Martinez, J. Leiding, and J. Owens), [Human Competitive Results](#) at the [Genetic and Evolutionary Computation Conference](#) (ACM SIG conference), 2006.
- **Best paper award** (with D.D. Johnson, A. L. Thompson, D. E. Goldberg, T. J. Martinez, J. Leiding, and J. Owens), real world applications track, [Genetic and Evolutionary Computation Conference](#) (ACM SIG conference), 2006.
- **Research Grant FA9550-06-1-0096** (with D. E. Goldberg and M. Pelikan). Air Force Office of Scientific Research, Air Force Materiel Command, USAF.
- The paper “Genetic programming for multiscale modeling” co-authored with D. D. Johnson, D. E. Goldberg, and P. Bellon was **chosen by American Institute of Physics (AIP) editors as a focused article of frontier research** in the *Virtual Journal of Nanoscale Science and Technology*, 12(9), 2005.
- **Nominated for best paper award** (with H. A. Abbass, D. E. Goldberg, and D.D. Johnson), estimation of distribution algorithms track, [Genetic and Evolutionary Computation Conference](#), 2005.
- **Nominated for best paper award** (with D. E. Goldberg), genetic algorithms track, [Genetic and Evolutionary Computation Conference](#), 2003.
- **Best paper award** (with M. V. Butz, and D. E. Goldberg), learning classifier systems track, [Genetic and Evolutionary Computation Conference](#), 2003.
- **Computational Science and Engineering Fellow**, University of Illinois, 2002-2003.
- **William A. Chittenden Award for outstanding master of science graduate in General Engineering**, 2001.
- Best theme oriented model award. APOGEE, all India science exhibition, 1997.
- Best exhibition award, APOGEE, all India science exhibition, 1997.

## PATENTS

### Methods for efficient solution set optimization.

Inventors: **Sastry, K.**, Pelikan, M., Goldberg, D. E.  
Status: Pending (US patent application 20060212279).

### Adaptive optimization methods.

Inventors: Lima, C. F., **Sastry, K.**, Goldberg, D. E., Lobo, F. G.  
Status: Pending.

### Methods and systems for interactive computing.

Inventors: Llorà, X., **Sastry, K.**, Goldberg, D. E.  
Status: Pending.

### E2K: Evolution to knowledge.

Inventors: Llorà, X., Goldberg, D. E., Welge, M., Auvil, L., **Sastry, K.**  
Status: Pending.

### Quantum Chemistry Simulations Using Optimization Methods.

Inventors: **Sastry, K.**, Thompson, A., Johnson, D.D., Martinez, T. J., Goldberg, D. E.  
Status: Pending.

### Methods for efficient solution to large-scale search and optimization problems.

Inventors: **Sastry, K.**, Goldberg, D. E., Llorà, X.  
Status: Filed invention disclosure to office of technology management.

## CURRENT RESEARCH

- Practical understanding of genetic algorithms (GAs), genetic programming (GP), and genetics-based machine learning algorithms (GBML).
- Design and analysis of *competent* Genetic and evolutionary algorithms that solve *hard* problems, quickly, reliably, and accurately.
  - Extensions to non-binary problem domains such as integer, real, and program domains.
  - Competent search methods for evolving rules in learning classifier systems
- Solving search, optimization, and machine-learning problems in material science and chemistry, especially in the area of multiscale modeling.
- Principled design of efficiency-enhancement techniques such as *evaluation relaxation*, *time continuation*, *parallelization*, and *hybridization*.
- Solving large-scale optimization problems with millions to billion variables.

## PROFESSIONAL ACTIVITIES

- **Co-Chair** Genetic Algorithms Track, Genetic and Evolutionary Computation Conference (ACM SIGEVO conference), 2007 (London).
- **Program committee member**, Genetic and Evolutionary Computation Conference, 2002 (New York, NY), 2003 (Chicago, IL), 2004 (Seattle, WA), 2005 (Washington, DC), 2006 (Seattle, WA), 2007 (London).

- **Co-organizer**, Workshop on Optimization by Building & Using Probabilistic Models (OBUPM), 2001 (San Francisco, CA), 2004 (Seattle, WA), 2005 (Washington, DC), 2006 (Seattle, WA), 2007 (London).
- Reviewer, Evolutionary Computation Journal
- Reviewer, IEEE Transactions on Evolutionary Computation
- Reviewer, IEEE Transactions on Systems, Man, and Cybernetics
- Reviewer, Journal of Heuristics
- Reviewer, Journal of Global Optimization
- **Electronic publicity chair**, Genetic and Evolutionary Computation Conference (GECCO-2002), New York, NY.
- **Project Coordinator**, APOGEE-97, an all India science exhibition.

## PROFESSIONAL MEMBERSHIPS

- Student Member, ACM SIGEVO, Special interest group for genetic and evolutionary computation
- Student Member, IEEE

## INVITED TALKS & TUTORIALS

- *Efficiency Enhancement Techniques in Estimation of Distribution Algorithms*. Grand opening of Missouri estimation of distribution laboratory (MEDAL). University of Missouri St. Louis, July 2006.
- *Principled Efficiency Enhancement Techniques*. Tutorial at Genetic and Evolutionary Computation Conference. June 2005.
- *Population Sizing for Genetic Programming Based On Decision Making*. Workshop on Parameter Setting in Evolutionary Algorithms. Genetic and Evolutionary Computation Conference. June 2005.
- *Understanding Complex Systems: A Design Decomposition Approach*. Nonlinear Dynamics and Complex Systems Seminar. Department of Physics. University of Illinois at Urbana-Champaign. April 2005.
- *Inducing Competent Neighborhood Operators: Probabilistic Model Building Approach*. Annual INFORMS meeting. Special session on Genetic Algorithms. October 2004.
- *Facetwise Understanding of Genetic Programming and Design of Competent Genetic Programming*. Department of Mathematics and Computer Science. University of Missouri at St. Louis. March 2004.
- *Genetic Programming for Multi-timescale Modeling*. Understanding Complex Systems. University of Illinois at Urbana-Champaign. May 2003.

## COLLABORATORS

Hussein A. Abbass (CS, University of Canberra, Australia) • B. V. Babu (Chem. Eng., BITS Pilani, India) • Jaume Bacardit (CSIT, University of Nottingham, UK) • L. Behera (ECE, IIT Kanpur, India) • Pascal Bellon (MSE, University of Illinois, USA) • Martin Butz (Psychology, University of Würzburg, Germany) • Erick Cantú-Paz (Yahoo! Inc., USA) • Chhanda Chakraborti (Philosophy, IIT Kharagpur, India) • Jian-Hung Chen (CS, Chung Hua University, Taiwan) • Ying-ping Chen (CS, National Chiao Tung University, Taiwan) • David E. Goldberg (IESE, University of Illinois, USA) • Georges Harik • Duane D. Johnson (MSE, University of Illinois, USA) • Graham Kendall (CSIT, University of Nottingham, UK) • Pier Luca Lanzi (CS, Politecnico di Milano, Italy) • Claudio F. Lima (CS, University of Algarve, Portugal) • Fernando Lobo (CS, University of Algarve, Portugal) • Xavier Llorà (NCSA, University of Illinois, USA) • Todd Martinez (Chem, University of Illinois, USA) • I. J. Nagrath (ECE, BITS Pilani, India) • Kei Ohnishi (CSE, Kyushu Institute of Technology, Japan) • Yukio Ohsawa (Systems Eng., University of Tokyo, Japan) • Una-May O'Reilly (CSAIL, MIT, USA) • Albert Orriols-Puig (CS, Ramon Llull University, Spain) • Luis de la Ossa (CS, University of Castilla la Mancha, Spain) • Martin Pelikan (Math & CS, University of Missouri St. Louis, USA) • Alexis L. Thompson (Chem, University of Illinois, USA) • Shigeyoshi Tsutsui (CS, Hannan University, Japan) • Noriko Imafuji Yasui (IESE, University of Illinois, USA) • Tian-Li Yu (ECE, National Taiwan University, Taiwan).

## PUBLICATIONS

### Summary

*h-index*: 12 ◊ *Total citations*: 471

## BOOKS

Goldberg, D. E., **Sastry, K.** *Genetic algorithms: The design of innovation*. (In preparation). 2nd edition. Berlin: Springer.

Pelikan, M., **Sastry, K.**, Cantú-Paz, E. (Eds.). (2006) *Scalable optimization via probabilistic modeling: From algorithms to applications*. Berlin: Springer.

## REFEREED JOURNAL PAPERS

Goldberg, D. E., **Sastry, K.**, Llorà, X. (2007). Toward routine billion-variable optimization using genetic algorithms. *Complexity*, 12(3), 27–29.

Chen, Y.-p., Yu, T.-L., **Sastry, K.**, Goldberg, D. E. (submitted). A Survey of linkage learning techniques in genetic and evolutionary algorithms. *IEEE Transactions on Evolutionary Computation*. ([Preprint: IlliGAL report no. 2007014](#)).

Pelikan, M., **Sastry, K.**, Butz, M. V., Goldberg, D. E. (submitted). Genetic and evolutionary algorithms on random additively decomposable problems. *Evolutionary Computation Journal*.

Pelikan, M., **Sastry, K.**, Goldberg, D. E. (accepted). Sporadic model building for efficiency enhancement of the hierarchical BOA. *Genetic Programming and Evolvable Machines*.

**Sastry, K.**, Johnson, D.D., Goldberg, D. E. (2007). Scalability of a hybrid extended compact genetic algorithm for ground state optimization of clusters. *Materials and Manufacturing Processes*, 22(5), 570–576.

- Sastry, K.**, Johnson, D.D., Thompson, A. L., Goldberg, D. E., Martinez, T. J., Leiding, J., Owens, J. (2007). Optimization of Semiempirical Quantum Chemistry Methods via Multiobjective Genetic Algorithms: Accurate Photochemistry for Larger Molecules and Longer Time Scales *Materials and Manufacturing Processes*, 22(5), 553–561.
- Sastry, K.**, Pelikan, M., Goldberg, D. E. (submitted). Efficiency enhancement of genetic algorithms by building an internal probabilistic model of fitness. *Evolutionary Computation Journal*.
- Butz, M.V., Goldberg, D.E., Lanzi, P.L., **Sastry, K.** (2007) Problem Solution Sustenance in XCS: Markov Chain Analysis of Niche Support Distributions and Consequent Computational Complexity. *Genetic Programming and Evolvable Machines*, 8(1), 5-57 ([Preprint: IlliGAL report no. 2004033](#)).
- Sastry, K.** Johnson, D. D., Goldberg, D. E., Bellon, P. (2005). Genetic programming for multi-timescale modeling. *Physical Review B*, 72, 085438. [Selected by AIP editors as focused article of frontier research in *Virtual Journal of Nanoscale Science and Technology*, 12(9), 2005].
- Butz, M. V., **Sastry, K.**, Goldberg, D. E. (2005). Strong, stable, and reliable fitness pressure in XCS due to tournament selection. *Genetic Programming and Evolvable Machines*, 6(1), 53–77. ([Preprint: IlliGAL report no. 2003027](#)).
- Sastry, K.**, Johnson, D. D., Goldberg, D. E., Bellon, P. (2004). Genetic programming for multiscale modeling. *International Journal for Multiscale Computational Engineering*, 2(2), 239–256.
- Pelikan, M., **Sastry, K.**, Goldberg, D. E. (2002). Scalability of the Bayesian optimization algorithm. *International Journal of Approximate Reasoning*, 31(3), 221–258. ([Preprint: IlliGAL report no. 2001029](#)).
- Babu, B.V., **Sastry, K. K. N.** (1999). Estimation of heat transfer parameters using differential evolution and orthogonal collocation. *Computers and Chemical Engineering*, 23, 327–339.
- Sastry, K. K. N.**, Behera, L., Nagrath, I. J. (1999). Differential evolution based fuzzy logic controller for non-linear process control. *Fundamenta Informaticae: Special Issue on Soft Computing*, 37(1-2), 121–136.

## BOOK CHAPTERS

- Yu, T.-L., **Sastry, K.**, Goldberg, D. E. (in press). Population sizing to go: Online adaptation using noise and substructural measurement. In Lobo, F., Lima, C., Michalewicz, Z. (Eds.), *Parameter Settings in Evolutionary Algorithms*. Berlin: Springer.
- Pelikan, M., **Sastry, K.**, Goldberg, D. E. (2006). Multiobjective estimation of distribution algorithms. In Pelikan, M., Sastry, K., Cantú-Paz, E. (Eds.), *Scalable Optimization via Probabilistic Modeling: From Algorithms to Applications*. Berlin: Springer.
- Sastry, K.**, Pelikan, M., Goldberg, D. E. (2006). Efficiency enhancement of estimation of distribution algorithms. In Pelikan, M., Sastry, K., Cantú-Paz, E. (Eds.), *Scalable optimization via Probabilistic Modeling: From Algorithms to Applications*. Berlin: Springer.
- Harik, G. R., Lobo, F. G., **Sastry, K.** (2006). Linkage learning via probabilistic modeling in the ECGA. In Pelikan, M., Sastry, K., Cantú-Paz, E. (Eds.), *Scalable Optimization via Probabilistic Modeling: From Algorithms to Applications*. Berlin: Springer.
- Llorà, X., **Sastry, K.**, Goldberg, D. E., de la Ossa, L. (in press). The  $\chi$ -ary extended compact classifier system: Linkage learning in Pittsburgh LCS. In Kovacs, T., Llorà, X., and Takadama,

- K. (Eds.), *Advances at the frontier of LCS*. Berlin: Springer.
- Llorà, X., **Sastry, K.**, Goldberg, D. E. (2007). Binary Rule Encoding Schemes: A Study Using The Compact Classifier System. In Kovacs, T., Llorà, X., Takadama, K., Lanzi, P. L., Stolzmann, W., Wilson, S. W. (Eds.), *Learning Classifier Systems*, 41–60. Berlin: Springer.
- Ondas, R., Pelikan, M., **Sastry, K.** (2006). Genetic programming, probabilistic incremental program evolution, and scalability. In Tiwari, A., Knowles, J., Avineri, E., Dahal, K., Roy, R. (Eds.) *Applications of Soft Computing: Recent Trends*. Berlin: Springer.
- Sastry, K.**, Goldberg, D.E., Kendall, G. (2005). Genetic algorithms: A tutorial. In Burke, E. and Kendall, G. (Eds), *Introductory Tutorials in Optimization, Search and Decision Support Methodologies*. Berlin: Springer.[Preprint](#).
- Sastry, K.**, O’Reilly, U.-M., Goldberg, D. E., (2004). Population sizing for genetic programming based upon decision making. In O’Reilly, U.-M., et al (Eds.), *Genetic Programming Theory and Practice II*, 49–66. Boston, MA: Kluwer Academic Publishers. ([Preprint: IlliGAL report no. 2004028](#)).
- Sastry, K.**, Goldberg, D. E. (2003). Probabilistic Model Building and Competent Genetic Programming. In Riolo, R., Worzel, B. (Eds.), *Genetic Programming Theory and Practice*, 205–220. Boston, MA: Kluwer Academic Publishers. ([Preprint: IlliGAL report no. 2003013](#)).
- Sastry, K.**, O’Reilly, U.-M., Goldberg, D. E., Hill, D. (2003). Building-Block Supply in Genetic Programming. In Riolo, R., Worzel, B. (Eds.), *Genetic Programming Theory and Practice*, 155–172. Boston, MA: Kluwer Academic Publishers. ([Preprint: IlliGAL report no. 2003012](#)).
- Goldberg, D. E., **Sastry, K.**, Ohsawa, Y. (2003). Discovering deep building blocks for competent genetic algorithms using chance discovery via KeyGraphs. In Ohsawa, Y., McBurney, P. (Eds.), *Chance Discovery*, 276–302. Berlin: Springer-Verlag. ([Preprint: IlliGAL report no. 2002026](#)).

## REFEREED CONFERENCE PAPERS

- Fossati, L., Lanzi, P. L., **Sastry, K.**, Goldberg, D. E., Gomez, O. (2007). A simple real-coded extended compact genetic algorithm. *Proceedings of the Congress on Evolutionary Computation (CEC 2007)*.
- Lima, C. F., Pelikan, M., Goldberg, D. E., Lobo, F. G., **Sastry, K.**, Hauschild, M. (2007). Influence of selection and replacement strategies on linkage learning in BOA. *Proceedings of the Congress on Evolutionary Computation (CEC 2007)*. ([Preprint: IlliGAL report no. 2007013](#)).
- Sastry, K.**, Goldberg, D. E. (2007). Let’s get ready to rumble redux: Crossover versus mutation head to head on exponentially scaled problems. *Genetic and Evolutionary Computation Conference (GECCO 2007)*. ([Preprint: IlliGAL report no. 2007006](#)).
- Sastry, K.**, Goldberg, D. E., Llorà, X. (2007). Towards billion bit optimization via parallel estimation of distribution algorithm. *Genetic and Evolutionary Computation Conference (GECCO 2007)*. ([Preprint: IlliGAL report no. 2007007](#)). [Best paper in Estimation of Distribution Algorithms track].
- Sastry, K.**, Pelikan, M., Goldberg, D. E. (Accepted). Empirical Analysis of ideal recombination on random decomposable problems. *Genetic and Evolutionary Computation Conference (GECCO 2007)*. ([Preprint: IlliGAL report no. 2006016](#)). [Nominated for best paper in Genetic Algorithms track].

- Orriols-Puig, A., **Sastry, K.**, Lanzi, P. L., Goldberg, D. E., Bernadó-Mansilla, E. (Accepted). Modeling selection pressure in XCS for proportionate and tournament selection. *Genetic and Evolutionary Computation Conference (GECCO 2007)*. (Preprint: [IlliGAL report no. 2007004](#)).
- Llorà, X., **Sastry, K.**, Yu, T.-L., Goldberg, D. E. (Accepted). Do not match, Inherit: Fitness surrogates for genetics-based machine learning techniques. *Genetic and Evolutionary Computation Conference (GECCO 2007)*. (Preprint: [IlliGAL report no. 2007011](#)).
- Orriols-Puig, A., Goldberg, D. E., **Sastry, K.**, Bernadó-Mansilla, E. (Accepted). Modeling XCS in class imbalances: Population sizing and parameter settings. *Genetic and Evolutionary Computation Conference (GECCO 2007)*. (Preprint: [IlliGAL report no. 2007001](#)).
- Bacardit, J., Stout, M., Hirst, J. D., Sastry, K., Llorà, X., Krasnogor, N. (Accepted). Automated alphabet reduction method with evolutionary algorithms for protein structure prediction. *Genetic and Evolutionary Computation Conference (GECCO 2007)*. (Preprint: [IlliGAL report no. 2007015](#)). [Bronze “Humies” award at the Human Competitive Results Competition].
- Hauschild, M., Pelikan, M., Lima, C. F., **Sastry, K.** (Accepted). Analyzing probabilistic models in hierarchical BOA on traps and spin glasses. *Genetic and Evolutionary Computation Conference (GECCO 2007)*. (Preprint: [Medal report no. 2007001](#)).
- Yu, T.-L., **Sastry, K.**, Goldberg, D. E., Pelikan, M. (Accepted). Population sizing for entropy-based model building in genetic algorithms. *Genetic and Evolutionary Computation Conference (GECCO 2007)*. (Preprint: [IlliGAL report no. 2006020](#)). [Nominated for the best paper award in Estimation of Distribution Algorithms track].
- Pelikan, M., Hartmann, A. K., **Sastry, K.** (2006). Hierarchical BOA, Cluster Exact Approximation, and Ising Spin Glasses. *Parallel Problem Solving from Nature (PPSN IX)*, 121–131.
- Lima, C. F., Pelikan, M., **Sastry, K.**, Butz, M. V., Goldberg, D. E., Lobo, F. G. (2006). Substructural neighborhoods for local search in the Bayesian optimization algorithm. *Parallel Problem Solving from Nature (PPSN IX)*. 232–241. (Preprint: [IlliGAL report no. 2006021](#)).
- Pelikan, M., **Sastry, K.**, Butz, M. V., Goldberg, D. E. (2006). Performance of evolutionary algorithms on random decomposable problems. *Parallel Problem Solving from Nature (PPSN IX)*, 788–797. (Preprint: [IlliGAL report no. 2006002](#)).
- Sastry, K.**, Johnson, D.D., Thompson, A. L., Goldberg, D. E., Martinez, T. J., Leiding, J., Owens, J. (2006). Multiobjective genetic algorithms for multiscaling excited state direct dynamics in photochemistry. *Genetic and Evolutionary Computation Conference (GECCO 2006)*. 1745–1752. (Preprint: [IlliGAL report no. 2006005](#)). [Best paper award in Real World Applications track] [Silver “Humies” award at the Human Competitive Results Competition].
- Sastry, K.**, Lima, C. F., Goldberg, D. E. (2006). Evaluation relaxation using substructural information and linear estimation. *Genetic and Evolutionary Computation Conference (GECCO 2006)*. 419–426. (Preprint: [IlliGAL report no. 2006003](#)).
- Llorà, X., **Sastry, K.** (2006). Fast rule matching for learning classifier systems via vector instructions. *Genetic and Evolutionary Computation Conference (GECCO 2006)*. 1513–1520. (Preprint: [IlliGAL report no. 2006001](#)).
- Pelikan, M., **Sastry, K.**, Goldberg, D. E. (2006). Sporadic model building for efficiency enhancement of hBOA. *Genetic and Evolutionary Computation Conference (GECCO 2006)*. 405–412. (Preprint: [IlliGAL report no. 2005026](#)).

- Alías, F., Llorà, X., Formiga, L., **Sastry, K.**, Goldberg, D. E. (2006). Efficient interactive weight tuning for TTS synthesis: Reducing user fatigue by improving user consistency. *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2006)*, 1, 865–868. (Preprint: [IlliGAL report no. 2005022](#)).
- Sastry, K.**, Winward, P., Goldberg, D. E., Lima, C. F. (2006). Fluctuating crosstalk as a source of deterministic noise and its effects on GA scalability. *Applications of Evolutionary Computing EvoWorkshops2006: EvoBIO, EvoCOMNET, EvoHOT, EvoIASP, EvoInteraction, EvoMUSART, EvoSTOCK*, 740–751. (Preprint: [IlliGAL report no. 2005025](#)).
- Llorà, X., **Sastry, K.**, Goldberg, D. E. (2005). The compact classifier system: Motivation, analysis and first results. *Proceedings of the 2005 Congress on Evolutionary Computation*, 1, 596–603. (Preprint: [IlliGAL report no. 2005019](#)).
- Yu, T.-L., **Sastry, K.**, Goldberg, D. E. (2005). Online population size adjusting using noise and substructural measurements. *Proceedings of the 2005 Congress on Evolutionary Computation Conference*, 3, 2491–2498. (Preprint: [IlliGAL report no. 2005017](#)).
- Sastry, K.**, Pelikan, M., Goldberg, D. E. (2005). Limits of scalability of multiobjective estimation of distribution algorithms. *Proceedings of the 2005 Congress on Evolutionary Computation*, 3, 2217–2224. (Preprint: [IlliGAL report no. 2005004](#)).
- Yu, T.-L., **Sastry, K.**, Goldberg, D. E. (2005). Linkage learning, overlapping building blocks, and a systematic strategy for scalable recombination. *Genetic and Evolutionary Computation Conference (GECCO 2005)*, 1217–1224. (Preprint: [IlliGAL report no. 2005016](#)).
- Llorà, X., **Sastry, K.**, Goldberg, D. E., Gupta, A., Lakshmi, L. (2005). Combating user fatigue in iGAs: Partial ordering, support vector machines, and synthetic fitness. *Genetic and Evolutionary Computation Conference (GECCO 2005)*, 1363–1370. (Preprint: [IlliGAL report no. 2005009](#)).
- Pelikan, M., **Sastry, K.**, Goldberg, D. E. (2005). Multiobjective hBOA, clustering, and scalability. *Genetic and Evolutionary Computation Conference (GECCO 2005)*, 663–670. (Preprint: [IlliGAL report no. 2005005](#)).
- Sastry, K.**, Abbass, H. A., Goldberg, D. E., Johnson, D. D. (2005). Sub-structural niching in estimation of distribution algorithms. *Genetic and Evolutionary Computation Conference (GECCO 2005)*, 671–678. (Preprint: [IlliGAL report no. 2005003](#)). [Nominated for best paper in Estimation of Distribution Algorithms track].
- Lima, C., **Sastry, K.**, Goldberg, D. E., Lobo, F. (2005). Combining competent crossover and mutation operators: A probabilistic model building approach. *Genetic and Evolutionary Computation Conference (GECCO 2005)*, 735–742. (Preprint: [IlliGAL report no. 2005002](#)).
- Sastry, K.**, Abbass, H. A., Goldberg, D. E. (2004). Sub-structural niching in non-stationary environments. *Proceedings of the Australian Artificial Intelligence Conference*, 873–885. (Preprint: [IlliGAL report no. 2004035](#)).
- Sastry, K.**, Pelikan, M., Goldberg, D. E. (2004). Efficiency enhancement of genetic algorithms via building-block-wise fitness estimation. *Proceedings of the 2004 Congress on Evolutionary Computation*, 720–727. (Preprint: [IlliGAL report no. 2004010](#)).
- Pelikan, M., **Sastry, K.** (2004). Fitness inheritance in the Bayesian optimization algorithm. *Genetic and Evolutionary Computation Conference (GECCO 2004)*, 2, 48–59. (Preprint: [IlliGAL report no. 2004009](#)).

- Ohnishi, K., **Sastry, K.**, Chen, Y.-p., Goldberg, D. E. (2004). Inducing sequentiality using grammatical genetic codes. *Genetic and Evolutionary Computation Conference (GECCO 2004)*, 2, 1426–1437. ([Preprint: IlliGAL report no. 2004007](#)).
- Sastry, K.**, Goldberg, D. E. (2004). Designing competent mutation operators via probabilistic model building of neighborhoods. *Genetic and Evolutionary Computation Conference (GECCO 2004)*, 2, 114–125. ([Preprint: IlliGAL report no. 2004006](#)).
- Sastry, K.**, Goldberg, D. E. (2004). Lets get ready to rumble: Crossover versus mutation head to head. *Genetic and Evolutionary Computation Conference (GECCO 2004)*, 2, 126–137. ([Preprint: IlliGAL report no. 2004005](#)).
- Yu, T.-L., Goldberg, D. E., **Sastry, K.** (2003). Optimal sampling and speed-up for genetic algorithms on the sampled OneMax problem. *Genetic and Evolutionary Computation Conference (GECCO 2003)*, 1554–1565. ([Preprint: IlliGAL report no. 2003008](#)).
- Butz, M. V., **Sastry, K.**, Goldberg, D. E. (2003). Tournament selection in XCS. *Genetic and Evolutionary Computation Conference (GECCO 2003)*, 1857–1869. ([Preprint: IlliGAL report no. 2002020](#)). [Best paper award in Learning Classifier Systems track].
- Sastry, K.**, Goldberg, D. E. (2003). Scalability of selectorecombinative genetic algorithms for problems with tight linkage. *Genetic and Evolutionary Computation Conference (GECCO 2003)*, 1332–1344. ([Preprint: IlliGAL report no. 2002013](#)). [Nominated for best paper award in Genetic Algorithms track].
- Chen, J.-H., Goldberg, D. E., Ho, S.-Y., **Sastry, K.** (2002). Fitness inheritance in multi-objective optimization. *Genetic and Evolutionary Computation Conference (GECCO 2002)*, 319–326. ([Preprint: IlliGAL report no. 2002017](#)).
- Sastry, K.**, Goldberg, D. E. (2002). Genetic algorithms, efficiency enhancement, and deciding well with fitness functions with differing variances. *Genetic and Evolutionary Computation Conference (GECCO 2002)*, 528–535. ([Preprint: IlliGAL report no. 2002003](#)).
- Sastry, K.**, Goldberg, D. E. (2002). Genetic algorithms, efficiency enhancement, and deciding well with fitness functions with differing bias values. *Genetic and Evolutionary Computation Conference (GECCO 2002)*, 536–543. ([Preprint: IlliGAL report no. 2002002](#)).
- Sastry, K.**, Goldberg, D. E. (2001). Modeling tournament selection with replacement using apparent added noise. *Intelligent Engineering Systems Through Artificial Neural Networks*, 11, 129–134. ([Preprint: IlliGAL report no. 2001014](#)).
- Tsutsui, S., Goldberg, D. E., **Sastry, K.** (2001). Linkage learning in real-coded GAs with simplex crossover. *Proceedings of the 5th International Conference on Artificial Evolution*, 51–58. ([Preprint: IlliGAL report no. 2000033](#)).
- Sastry, K.**, Goldberg, D. E., Pelikan, M. (2001). Dont evaluate, inherit. *Genetic and Evolutionary Computation Conference (GECCO 2001)*, 551–558. ([Preprint: IlliGAL report no. 2001013](#)).
- Goldberg, D. E., **Sastry, K.**, Latoza, T. (2001). On the supply of building blocks. *Genetic and Evolutionary Computation Conference (GECCO 2001)*, 336–342. ([Preprint: IlliGAL report no. 2001015](#)).
- Goldberg, D. E., **Sastry, K.** (2001). A practical schema theorem for genetic algorithm design and tuning. *Genetic and Evolutionary Computation Conference (GECCO 2001)*, 328–335. ([Preprint: IlliGAL report no. 2001017](#)).

- Pelikan, M., Goldberg, D. E., **Sastry, K.** (2001). Bayesian optimization algorithm, decision graphs, and Occams razor. *Genetic and Evolutionary Computation Conference (GECCO 2001)*, 519–526. (Preprint: [IlliGAL report no. 2000020](#)).
- Chakraborti, C., **Sastry, K. K. N.** (1998). Testing the validity of logical arguments using genetic algorithms. *Proceedings of the International Conference on Knowledge based Computer Systems (KBCS 98)*, 117–126.
- Chakraborti, C., **Sastry, K. K. N.** (1998). Genetic algorithms approach for proving logical arguments in natural language. *Genetic Programming 1998: Proceedings of the Third Annual Conference*, 463–470.

## REFEREED CONFERENCE POSTERS

- Minqiang, L., Goldberg, D. E., **Sastry, K.**, Yu, T. L. (Accepted). Real-coded ECGA for solving decomposable real-valued optimization problems. *Genetic and Evolutionary Computation Conference (GECCO 2007)*.
- Minqiang, L., Goldberg, D. E., **Sastry, K.**, Yu, T. L. (Accepted). Performance analyses of factorization based on Gaussian PDF in RECGA. *Genetic and Evolutionary Computation Conference (GECCO 2007)*.
- Pelikan, M., **Sastry, K.**, Butz, M. V., Goldberg, D. E. (2006). Hierarchical BOA on random decomposable problems. *Genetic and Evolutionary Computation Conference (GECCO 2006)*. 431–432. (Preprint: [IlliGAL report no. 2006002](#)).
- Llorà, X., **Sastry, K.**, Alías, F., Goldberg, D. E., Welge, M. (2006). Analyzing active interactive genetic algorithms using visual analytics. *Genetic and Evolutionary Computation Conference (GECCO 2006)*. 1417–1418. (Preprint: [IlliGAL report no. 2006004](#)).
- Ondas, R., Pelikan, M., **Sastry, K.** (2005). Scalability of genetic programming and probabilistic incremental program evolution. *Genetic and Evolutionary Computation Conference (GECCO 2005)*, 1785–1786. (Preprint: [arXiv:cs.NE/0502029](#)).
- Llorà, X., **Sastry, K.**, Goldberg, D. E. (2005). The compact classifier system: Motivation, analysis and first results. *Genetic and Evolutionary Computation Conference (GECCO 2005)*, 1893–1894. (Preprint: [IlliGAL report no. 2005019](#)).
- Sastry, K.**, Goldberg, D. E. (2001). Modeling tournament selection with replacement using apparent added noise. *Genetic and Evolutionary Computation Conference (GECCO 2001)*, 781.

## WORKSHOPS & NON-REFEREED CONFERENCES

- Sastry, K.**, Pelikan, M., Goldberg, D. E. (2004). Efficiency enhancement of probabilistic model building genetic algorithms. *Optimization by Building and Using Probabilistic Models: Workshop at the Genetic and Evolutionary Computation Conference*. (Preprint: [IlliGAL report no. 2004020](#)).
- Sastry, K.**, Goldberg, D. E. (2002). How well does a single-point crossover mix building blocks with tight linkage? *Proceedings of the International Symposium on Computer and Information Science*. (Preprint: [IlliGAL report no. 2002013](#)).

- Sastry, K.** (2001). Efficient cluster optimization using a hybrid extended compact genetic algorithm with a seeded population, *Workshop Proceedings of the Genetic and Evolutionary Computation Conference*, 222–225. (Preprint: [IlliGAL report no. 2001018](#)).
- Sastry, K.**, Goldberg, D. E. (2000). On extended compact genetic algorithm. *Late Breaking Paper in Genetic and Evolutionary Computation Conference*, 352–359. (Preprint: [IlliGAL report no. 2000026](#)).
- Chakraborti, C., **Sastry, K. K. N.** (1997). Genetic algorithms: An efficient alternative for 'proving logical arguments. *Evonews*, 17–18.
- Sastry, K. K. N.**, Behera, L., Nagrath, I. J. (1997). A self organizing fuzzy controller design using differential evolution. *Proceedings of the Sixth Symposium on Intelligent Systems*, 166–177.

## TECHNICAL REPORTS

- Orriols-Puig, A., **Sastry, K.**, Goldberg, D. E., Bernadó-Manzilla, E. (2007). *Substructural surrogates for learning decomposable classification problems: Implementation and first results*. [IlliGAL report no. 2007010](#). University of Illinois at Urbana-Champaign, Urbana, IL.
- Sastry, K.**, Orriols-Puig, A. (2007). *Extended compact genetic algorithm in matlab*. [IlliGAL report no. 2007009](#). University of Illinois at Urbana-Champaign, Urbana, IL.
- Ueda, T., Imafuji, N., Llorà, X., **Sastry, K.**, Goldberg, D. E. (2007). *Toward context-aware semantic building block identification for text streams using EDAs*.
- Pelikan, M., **Sastry, K.**, Butz, M. V., Goldberg, D. E. (2006). *Generator and interface for random decomposable problems in C*. [MEDAL report no. 2006003](#). University of Missouri-St. Louis, St. Louis, MO.
- Sastry, K.**, de la Ossa, L., Lobo, F. G. (2006).  *$\chi$ -ary extended compact genetic algorithm for matlab in C++*. [IlliGAL report no. 2006014](#). University of Illinois at Urbana-Champaign, Urbana, IL.
- de la Ossa, L., **Sastry, K.**, Lobo, F. G. (2006).  *$\chi$ -ary extended compact genetic algorithm in C++*. [IlliGAL report no. 2006013](#). University of Illinois at Urbana-Champaign, Urbana, IL.
- Lobo, F. G., **Sastry, K.**, Harik, G. R. (2006). *Extended compact genetic algorithm in C++: Version 1.1*. [IlliGAL report no. 2006012](#). University of Illinois at Urbana-Champaign, Urbana, IL.
- Llorà, X., Alías, F. , Formiga, L., **Sastry, K.**, Goldberg, D. E. (2005). *Evaluation consistency in iGAs: User contradictions as cycles in partial-ordering graphs*. [IlliGAL report no. 2005022](#). University of Illinois at Urbana-Champaign, Urbana, IL.
- Abbass, H. A., **Sastry, K.**, Goldberg, D. E. (2004). *Oiling the wheels of change: The role of adaptive automatic problem decomposition in non-stationary environments*. [IlliGAL report no. 2004029](#). University of Illinois at Urbana-Champaign, Urbana, IL.
- Sastry, K.**, Goldberg, D. E. (2002). *Analysis of mixing in genetic algorithms: A survey*. [IlliGAL report no. 2002012](#). University of Illinois at Urbana-Champaign, Urbana, IL.
- Sastry, K.** (2002). *Evaluation-Relaxation Schemes for Genetic and Evolutionary Algorithms*. Masters Thesis. Department of General Engineering. University of Illinois at Urbana-Champaign, Urbana, IL. [William A. Chittenden Award for outstanding master of science graduate in General Engineering] (Preprint: [IlliGAL report no. 2002004](#)).

- Pelikan, M., **Sastry, K.**, Goldberg, D. E. (2001). *Evolutionary algorithms + graphical models = scalable black-box optimization*. [IlliGAL report no. 2001029](#). University of Illinois at Urbana-Champaign, Urbana, IL.
- Sastry, K.**, Xiao, G. (2001). *Silicon cluster optimization using extended compact genetic algorithm*. [IlliGAL report no. 2001016](#). University of Illinois at Urbana-Champaign, Urbana, IL.

## SOURCE CODE

### Extended compact genetic algorithm in matlab

**Sastry, K.**, Orriols-Puig, A.

Documentation: <http://www.illigal.uiuc.edu/pub/papers/IlliGALs/2007009.pdf>

Source: <http://www.illigal.uiuc.edu/pub/src/ECGA/eCGAmatlab.zip>

### Generator and interface for random decomposable problems in C.

Pelikan, M., **Sastry, K.**, Butz, M. V., Goldberg, D. E.

Documentation: <http://medal.cs.umsl.edu/files/2006003.pdf>

Source: <http://medal.cs.umsl.edu/files/decomposable-problems.tar.gz>

### $\chi$ -ary extended compact genetic algorithm for matlab in C++.

**Sastry, K.**, de la Ossa, L., Lobo, F. G.

Documentation: <http://www.illigal.uiuc.edu/pub/papers/IlliGALs/2006014.pdf>

Source: [http://www.illigal.uiuc.edu/pub/src/ECGA/chiECGA\\_matlab.tgz](http://www.illigal.uiuc.edu/pub/src/ECGA/chiECGA_matlab.tgz)

### $\chi$ -ary extended compact genetic algorithm in C++.

de la Ossa, L., **Sastry, K.**, Lobo, F. G.

Documentation: <http://www.illigal.uiuc.edu/pub/papers/IlliGALs/2006013.pdf>

Source: <http://www.illigal.uiuc.edu/pub/src/ECGA/chiECGA.tgz>

### Extended compact genetic algorithm in C++: Version 1.1.

Lobo, F. G., **Sastry, K.**, Harik, G.

Documentation: <http://www.illigal.uiuc.edu/pub/papers/IlliGALs/2006012.pdf>

Source: [http://www.illigal.uiuc.edu/pub/src/ECGA/ECGA\\_1.1.tgz](http://www.illigal.uiuc.edu/pub/src/ECGA/ECGA_1.1.tgz)

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