J. Deon Garrett

Research Scientist in Artificial Intelligence and Assistant Professor of Computer Science
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Education

- **Ph.D., Computer Science**, University of Memphis.
  Thesis: *Multiobjective Fitness Landscape Analysis and the Design of Effective Memetic Algorithms*.
  Advisor: Dipankar Dasgupta.
  May, 2008.
- **M.S., Computer Science**, Arkansas State University.
  Thesis: *Using Bidirectional Ray Tracing to Accurately Model Diffuse Lighting*.
  Advisor: Edward T. Hammerand.
  August, 1999.
- **B.S., Computer Science**, Arkansas State University.
  May, 1998.

Research Interests

- Multiobjective and combinatorial optimization using metaheuristics. In particular, I am interested in understanding the structure of multiobjective search spaces and leveraging this information to construct better search and optimization algorithms for multiobjective problems.
- Hyperheuristics – algorithms that observe and react to perceived properties of a search space and adapt their behavior during the search accordingly.
- Machine learning algorithms and applications.
- Reinforcement learning.
- Functional programming.

Grants and Awards

- *Adaptive Resistance Control in Prosthetic Knee Joints*, **PI**. Collaboration with Össur, ehf. and Kristinn R. Þórisson, Reykjavík University.
  Duration: 4 months.
  Amount: 4.000.000 ISK.
  Start Date: May, 2014.
- *Large Scale Machine Learning for Simultaneous Heterogeneous Tasks*, (EU Marie Curie CIG: 304210).**PI**. Collaboration with Kristinn Þórisson, Reykjavík University; Yngví Björnsson, Reykjavík University; Charles Anderson, Colorado State University.
  Duration: 3 years.
  Amount: €75,000.
  Start Date: May, 2012.

Publications

Refereed Journal Articles

1. Samuel Perkin, **Deon Garrett**, and Pall Jensson. Optimal Wind Turbine Selection Methodology: A Case-Study for Búrfell, Iceland. *Renewable Energy*. August, 2014. (Under revision).

2. Helgi Pall Helgason, Kristinn R. Thorisson, and **Deon Garrett**. Towards a General Attention Mechanism for Embedded Intelligent Systems. *International Journal of Computer Science and Artificial Intelligence*. 4(1), pp. 1–7. March, 2014.

3. **Deon Garrett**, David Peterson, Charles Anderson, and Michael Thaut. Comparison of Linear, Nonlinear, and Feature Selection Methods for EEG Signal Classification. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*. 11(2), pp. 141–144. June, 2003. **Winner of the 2008 IEEE Engineering in Medicine and Biology Society (EMB) Award for Outstanding Paper in the Neural Systems technical area**.

Refereed Book Chapters

1. Dipankar Dasgupta, **Deon Garrett**, German Hernandez, Fernando Nino, Andres Romero, Aishwarya Kaushal, and James Simien. Genetic-Based Solutions to Variations of the United States Navy's Sailor Assignment Problem. *Variants of Evolutionary Algorithms for Real-World Applications*. Ed. Raymond Chiong, Thomas Weise, and Zbigniew Michalewicz. Springer. 2011.

2. **Deon Garrett**, Dipankar Dasgupta, Joseph Vannucci, and James Simien. Applying Multiobjective Evolutionary Algorithms to the Sailor Assignment Problem. *Advances in Evolutionary Computing for System Design*. Ed. Lakhmi Jain, Vasile Palade, and Dipti Srinivasan. Springer. 2007.

Refereed Conference Papers

1. **Deon Garrett**, Jordi Bieger, and Kristinn R. Thorisson. Tunable and Generic Problem Instance Generation for Multi-task Reinforcement Learning. *Submitted to the IEEE Symposium on Adaptive Dynamic Programming and Reinforcement Learning (ADPRL '14)*. 2014.

2. Samuel Perkin, **Deon Garrett**, and Páll Jensson. Wind Turbine Selection: A Case-Study for Búrfell Iceland. *Submitted to the 2014 Genetic and Evolutionary Computation Conference (GECCO '14)*. 2014.

3. **Deon Garrett**. A Call for Collaborative Landscape Analysis. *First Workshop on Understanding Problems: (GECCO '12)*. Philadelphia, PA. July, 2012.

4. **Deon Garrett**. PMF: A Multicore-Enabled Framework for the Construction of Metaheuristics for Single and Multiobjective Optimization. *Parallel Problem Solving From Nature (PPSN '10)*. Krakow, Poland. September, 2010.

5. Dipankar Dasgupta, Harkeerat Bedi, and **Deon Garrett**. A Conceptual Model of Self-Monitoring Multi-Core Systems. *Sixth Annual Workshop on Cyber Security and Information Intelligence Research (CSIIRW)*. Oak Ridge, TN. April, 2010.

6. Dipankar Dasgupta, Fernando Nino, **Deon Garrett**, Koyel Chaudhuri, Soujanya Medapati, Aishwarya Kaushal, and James Simien. A Multiobjective Evolutionary Algorithm for the Task-Based Sailor Assignment Problem. *Genetic and Evolutionary Computation Conference (GECCO '09)*. Montreal, Canada. July, 2009.

7. **Deon Garrett**. Plateau Connection Structure and Multiobjective Metaheuristic Performance. *IEEE Congress on Evolutionary Computation (CEC '09)*. Trondheim, Norway. May, 2009.

8. **Deon Garrett** and Dipankar Dasgupta. An Empirical Comparison of Memetic Algorithm Strategies on the Multiobjective Quadratic Assignment Problem. *IEEE Symposium on Computational Intelligence*. Nashville, TN. March, 2009.

9. Dipankar Dasgupta, German Hernandez, Andres Romero, **Deon Garrett**, Aishwarya Kaushal, and James Simien. On The Use of Informed Initialization and Extreme Solutions Sub-population in Multiobjective Evolutionary Algorithms. *IEEE Symposium on Computational Intelligence*. Nashville, TN. March, 2009.

10. Eric S. Imsand, **Deon Garrett**, and John A. Hamilton Jr.. User Identification Using GUI Manipulation Patterns and Artificial Neural Networks. *IEEE Symposium on Computational Intelligence*. Nashville, TN. March, 2009.

11. Dipankar Dasgupta, German Hernandez, **Deon Garrett**, Pavan K. Vejandla, Aishwarya Kaushal, Ramjee Yerneni, and James Simien. A Comparison of Multiobjective Evolutionary Algorithms with Informed Initialization and the Kuhn-Munkres Algorithm for the Sailor Assignment Problem. *Genetic and Evolutionary Computation Conference (GECCO '08)*. Atlanta, GA. July, 2008.

12. **Deon Garrett** and Dipankar Dasgupta. Multiobjective Landscape Analysis and the Generalized Assignment Problem. *Learning in Intelligent Optimization (LION-II)*. Trento, Italy. December, 2007.

13. Sankalp Balachandran, Dipankar Dasgupta, Fernando Nino, and **Deon Garrett**. A Framework for Evolving Multi-Shaped Detectors in Negative Selection. *IEEE Symposium on Foundations of Computational Intelligence (FOCI '07)*. Honolulu, HI. April, 2007.

14. **Deon Garrett** and Dipankar Dasgupta. Analyzing the Performance of Hybrid Evolutionary Algorithms for the Multiobjective Quadratic Assignment Problem. *IEEE Congress on Evolutionary Computation (CEC '06)*. Vancouver, Canada. July, 2006.

15. **Deon Garrett**, Dipankar Dasgupta, Rodrigo Silva, Joseph Vannucci, and James Simien. Genetic Algorithms for the Sailor Assignment Problem. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO '05)*. pp. 1921–1928. Washington, DC. July, 2005. **Nominated for Best Paper award in Real World Applications track.**.

16. Darrell Whitley, **Deon Garrett**, and Jean-Paul Watson. Quad Search and Hybrid Genetic Algorithms. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO '03)*. pp. 1469–1480. Chicago, IL. July, 2003.

Presentations

1. Pareto Connection Graphs and Metaheuristic Performance. INFORMS Annual Meeting. Washington, DC. October, 2008.

2. GenoSAP-II Final Report. Navy Personnel Research, Studies, and Technology. Millington, TN. August, 2008.

3. How To ~~Write Your~~ Type My Dissertation: Optimizing Keyboard Layout for LaTeX and C++. Student Research Forum. Memphis, TN. April, 2008. **1st Runner Up for Best Presentation**.

4. GenoSAP Final Report. Navy Personnel Research, Studies, and Technology. Millington, TN. August, 2005.

Research Experience

- **Research Scientist, Icelandic Institute for Intelligent Machines**
  August, 2010 – Present
  Perform research into machine learning and other aspects of Artificial General Intelligence. Responsible for supervision of projects, grant proposals, as well as coding and algorithm design issues.

- **Postdoctoral Research Associate, University of Memphis**
  March, 2008 – May, 2010
  Supervised a team of graduate students on an incremental grant from Navy Personnel Research, Studies, and Technology (NPRST) working on a multiobjective combinatorial optimization problem optimizing the scheduling and assignment of sailors to available jobs and continued participation in weekly research group meetings. Position held concurrently with position at AutoZone, Inc.

- **Graduate Research Assistant, University of Memphis**
  August, 2004 – March, 2008
  Worked on a grant funded by the United States Navy Personnel Research, Studies, and Technology. The work led to the development of evolutionary and other metaheuristics aimed at the problem of optimally assigning sailors to available jobs. Participated in weekly research group meetings as part of the Intelligent Security Systems Research Laboratory under Professor Dipankar Dasgupta. Research topics and presentations included evolutionary computation, local search, landscape analysis, support vector machines, and applications to computer security and other areas.

- **Graduate Research Assistant, Colorado State University**
  June, 2000 – December, 2002
  Performed research in artificial intelligence, primarily in the areas of genetic algorithms, local search, and machine learning algorithms. Problem domains included computer security and intrusion detection, EEG pattern recognition, and weather prediction from atmospheric satellite data.

Teaching Experience

- **Assistant Professor, School of Computer Science, Reykjavík University**
  April, 2011 – Present
  Joint appointment with IIIM, involves light teaching and service responsibilities.
- **Graduate Teaching Assistant, University of Memphis**
  August, 2004 – July, 2006
  Taught courses in the Department of Computer Science including Introduction to Java Programming, Data Structures, and a laboratory for Discrete Mathematics.
- **Visiting Instructor in Computer Science, Arkansas State University**
  August, 2003 – May, 2004
  Taught numerous courses in Computer Science, including Programming I, Programming II, Computer Architecture, Operating Systems, Software Engineering I, and Software Engineering II.
- **Graduate Teaching Assistant, Colorado State University**
  August, 2002 – December, 2002
  Aiding in the teaching and administration of a course in Artificial Intelligence under Professor Adele Howe. Responsibilities included occasional lectures, maintaining the course web site, grading assignments, and assisting students during office and lab hours. Nominated by the students for the departmental award for outstanding teaching assistant by the students.
- **Visiting Instructor in Computer Science, Lyon College**
  August, 1999 – May, 2000
  Taught courses in Computer Science and Mathematics. Assisted in development of the Computer Science major. Courses taught include C/C++ Programming, Data Structures, Analysis of Algorithms, Discrete Mathematics, Assembly Language and Computer Organization, and Elementary Functions.
- **Graduate Teaching Assistant, Arkansas State University**
  May, 1998 – July, 1999
  Taught several developmental mathematics courses and performed other miscellaneous departmental duties.

Professional Experience

- **Founder and Director, Greind Technologies, LLC**
  June, 2012 – Present
  Consulting firm specializing in contract software development, particularly in mobile application development. Current sales to date exceeding $60,000 US.
- **Technical Architect, R&D, AutoZone, Inc.**
  January, 2009 – August, 2010
  Led R&D initiatives to implement and deploy numerous projects, including a complete "Buy Online, Pick up in Store" solution and a unified search engine for many previously isolated AutoZone information repositories. Ongoing work includes development of mobile solutions based on the iPhone for both customers and internal personnel and providing expertise in rewriting a large C++ application currently suffering from significant problems.
- **Sr. Programmer Analyst, R&D, AutoZone, Inc.**
  June, 2007 – January, 2009
  Investigated and developed hardware and software solutions for various requirements throughout the organization, including self-checkout kiosks, GPS tracking of commercial delivery vehicles, and a move to graphical software development using the Qt framework. I served as a primary liason between the R&D group and the AutoZone software engineering and project management structure.

- **Programmer Analyst, AutoZone, Inc.**
  January, 2007 – June, 2007
  Worked on the development and deployment of AutoZone's next generation part lookup application, Z-net. After previous attempts at constructing Z-net had been delayed by two years, my team delivered the application on time. In addition to design and coding, I handled the preparation and execution of released versions of the software to the more than 4000 stores in the AutoZone chain.
- **Programmer, AutoZone, Inc.**
  August, 2006 – January, 2007
  Supported numerous in-house C and C++ applications and assisted in the development of AutoZone's next generation part lookup application, Z-net.

Professional Activities

- International Conference on Artificial Intelligence and Statistics (AISTATS 2014) (Local chair)
- European Machine Learning Summer School (MLSS-Iceland 2014) (Local chair)
- Genetic and Evolutionary Computation Conference (GECCO) (Program Committee (PC)).
- Learning in Intelligent Optimization (LION) (PC).
- IEEE Transactions on Evolutionary Computation (Referee).
- IEEE Congress on Evolutionary Computation (CEC) (PC).
- Evolutionary Computation (Referee).
- European Conference on Artificial Intelligence (ECAI) (PC).
- European Conference on Machine Learning (ECML-PKDD) (PC).
- Workshop on Understanding Problems at GECCO 2012 (Referee).
- Artificial General Intelligence (AGI) (PC).
- Workshop on Self-Programming in AGI Systems, part of Artificial General Intelligence (AGI '11) (Organizer).
- Natural Computing (Referee).
- Engineering Applications of Artificial Intelligence (Referee).
- Journal of Neuroscience Methods (Referee).
- Biomedical Signal Processing and Control (Referee).
- Computer Methods and Programs in Biomedicine (Referee).
- Annual Simulation Symposium (ANSS '09), Part of the 2009 ACM Spring Simulation Multiconference (Referee).

Technical Skills

- C/C++
- Python
- Unix (Systems Programming, POSIX utilities, etc.)
- Clojure
- Java

- Common Lisp
- Haskell
- MATLAB
- Proficiency in many others

Courses Taught

- Programming I (C++, Java) (UG; Arkansas State University, Lyon College, University of Memphis)
- Programming II (C++, Java) (UG; ASU, UM)
- Data Structures (UG; UM, LC)
- Elementary Functions (UG; LC)
- Laboratory for Discrete Mathematics (UG; UM)
- Operating Systems (UG; ASU)
- Computer Architecture (UG; ASU)
- Assembly Language Programming (UG; LC)
- Advanced Data Structures and Analysis of Algorithms (UG; LC)
- Software Engineering I (UG/G; ASU)
- Software Engineering II (UG/G; ASU)
- Introduction to Machine Learning (UG/G; RU)
- Advanced Topics in Machine Learning (G; RU)
- Guest lectures in graduate research seminars in Computational Intelligence and Artificial Intelligence

Professional Societies

- ACM
- SIGEVO (ACM Special Interest Group on Evolutionary Computation)
- AAAI
- INFORMS