Dr. Steven Michael Corns
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EDUCATION:

- PhD. Iowa State University, Ames, IA, Mechanical Engineering, May 2008
  Dissertation: *The Role of Information Flow in Engineering Optimization.*
- M. S. Iowa State University, Ames, IA, Mechanical Engineering, Minor in Complex Adaptive Systems, December 2003.
  Thesis: *Measuring Information Exchange Rate for Graph Based Evolutionary Algorithms in Engineering Optimization.*
- B. S. Iowa State University, Ames, IA, Mechanical Engineering, December 2001.

RESEARCH:

Research Interests:

I am interested in optimization of not only engineering problems, but the application of artificial intelligence techniques to problems in engineering and biology. I am also involved in theoretical applications of evolutionary computation methods, such as graph based evolutionary algorithms. Some points of interest are:

- Integration of Complex Adaptive System for increasing energy efficiency and optimizing use of renewable and alternative energy sources.
- Modeling of disease spread and epidemiology and using evolutionary computation methods to explore these models.
- Bioinformatics and applying evolutionary computation methods to biological systems.
- Methodical study of Evolutionary Computation to improve performance, including development of a taxonomy of methods and problems.

TECHNICAL PUBLICATIONS:

Refereed Journal Articles:

1. K. Mark Bryden, Daniel A. Ashlock, Steven M. Corns, and Stephen J. Willson, "Graph Based Evolutionary Algorithms", *IEEE Transactions on Evolutionary Computations*, Vol. 10:5, pp. 550-567, October, 2006.
2. Hurd, H.S., C. Enøe, L. Sørensen, H. Wachman, S.M. Corns, K.M. Bryden, and M. Grenier, 2008. Risk-Based Analysis of the Danish Pork *Salmonella* Program: Past and Future. *Risk Analysis*. 28:2:341-351.

Book Chapters:

1. Steven M. Corns, Daniel A. Ashlock and Kenneth Mark Bryden, "Graph Based Evolutionary Algorithms, In *Advancing Artificial Intelligence through Biological Process Applications*, ed. By Ana B. Porto, Alejandro Pazos and Washington Buño, ISBN # 978-1-59904-996-0, in press.

Presentations and Invited Talks:

1. "The Integration of Systems Modeling into a Virtual Engineering Environment," *VE_Suite Annual Meeting*, Ames, IA, 28 October, 2008.
2. "Classroom Management," University Teaching Seminar, Iowa State University, August 15, 2007.

Peer Reviewed Conference Proceedings:

1. S. M. Corns, R. P. Taylor, D. A. Ashlock, and K. M. Bryden "Extending Graph Based Evolutionary Algorithms with Novel Graphs," *Intelligent Engineering Systems through Artificial Neural Networks*, edited by C. H. Dagli et al., ASME Press , vol. 18, pages 35-44, 2008.
2. D. A. Ashlock, K. M. Bryden, and S. M. Corns "Small Population Effects and Hybridization," in Proceedings of the 2008 IEEE World Congress on Computational Intelligence, pages 2642-2648, 2008.
3. S. M. Corns, D. A. Ashlock and K. M. Bryden, "Optimizing Tartarus Controllers using Graph Based Evolutionary Algorithms," *Intelligent Engineering Systems through Artificial Neural Networks*, edited by C. H. Dagli et al., ASME Press , vol. 17, pages 195-200, 2007.
4. S. M. Corns, H. S. Hurd, D. A. Ashlock and K. M. Bryden, "Evolutionary Optimization of an Antibiotic Feed Regimen Applied to Multiple Bacteria," in *Intelligent Engineering Systems through Artificial Neural Networks*, edited by C. H. Dagli et al., ASME Press , vol. 16, pages 255-260, 2006.
5. S. M. Corns, D. A. Ashlock and K. M. Bryden, "Takeover Times in Graph Based Evolutionary Algorithms," in *Intelligent Engineering Systems through Artificial Neural Networks*, edited by C. H. Dagli et al., ASME Press , vol. 16, pages 119-124, 2006.
6. Steven M. Corns, H. Scott Hurd, Lorraine J. Hoffman and K. Mark Bryden, "Evolving Antibiotic Regimens to Minimize Bacterial Resistance in Swine," 11th Annual AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Portsmouth, VA, On-line proceedings, 2006.
7. S. M. Corns, H. S. Hurd, D. A. Ashlock and K. M. Bryden, "Developing Antibiotic Regimens Using Evolutionary Algorithms," Proceedings of the 2006 IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology, pages 476-481, 2006.
8. D. Ashlock, K. Cottenie, L. Carson, K. M. Bryden and S. Corns, "An Evolutionary Algorithm for the Selection of Geographically Informatics Species," Proceedings of the 2006 IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology, pages 279-285, 2006.
9. S. M. Corns, D. A. Ashlock, D.S. McCorkle and K. M. Bryden, "Improving Design Diversity Using Graph Based Evolutionary Algorithms," Proceedings of the 2006 IEEE World Congress on Computational Intelligence, pages 1037-1043, 2006.

10. D. A. Ashlock, K. M. Bryden, S. M. Corns and Justin Schonfeld, "An Updated Taxonomy of Evolutionary Computation Problems Using Graph-Based Evolutionary Algorithms," in Proceedings of the 2006 IEEE World Congress on Computational Intelligence, pages 403-410, 2006.
11. S. M. Corns, K. M. Bryden, and D. A. Ashlock, "The Impact of Novel Connection Topologies on Graph Based Evolutionary Algorithms", *Smart Engineering System Design: Neural Networks, Evolutionary Programming, and Artificial Life*, edited by C. H. Dagli et al., ASME Press, 15:201-209 , 2005.
12. S. Corns, K. Bryden, D. Ashlock and D. Muth *On the Effects of Representation on Evolving Grid Robot*, Proceedings of the 2005 IEEE Congress on Evolutionary Computation, pages 1135-1140, 2005.
13. S. Corns, K. Bryden and D. Ashlock *Solution Transfer Rates in Graph Based Evolutionary Algorithms*, Proceedings of the 2005 Congress on Evolutionary Computation, pages 1699-1705, 2005.
14. D. Ashlock, K. M. Bryden, and S. Corns, *Graph Based Evolutionary Algorithms Enhance the Location of Steiner Systems,* Proceedings of the 2005 Congress on Evolutionary Computation, Vol. 2, pages 1861-1866, 2005.
15. Dan Ashlock, Kenneth M. Bryden, Steven Corns, and Stephen J. Willson, *A Taxonomy of Evolutionary Computation Problems*, in Intelligent Engineering Systems Through Artificial Neural Networks, Vol 14:235-240, 2004.
16. D. A. Ashlock, S. J. Emrich, K. M. Bryden, S.M. Corns, T.J. Wen, and P. S. Schnable, *A Comparison of Evolved Finite State Classifiers and Interpolated Markov Models for Improving PCR Primer Design*, in the Proceedings of the 2004 IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology (CIBCB '04): 190-197, 2004.
17. D. A. Ashlock, K. M. Bryden, S. Corns, P. S. Schnable and T.J. Wen, *Training Finite State Classifiers to Improve PCR Primer Design*, 10th Annual AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Albany, NY, 2004.
18. Daniel Ashlock, Kenneth Bryden and Steven Corns, *On the Taxonomy of Evolutionary Computation Problems*, in Proceedings of the 2004 Congress on Evolutionary Computation, Vol 2:1713-1719, 2004.
19. Steven M. Corns, Kenneth M. Bryden, Daniel A. Ashlock, *Rate of Information Transfer in Graph Based Evolutionary Algorithms*, Proceedings of ANNIE:261-266, 2003.
20. Steven M. Corns, Kenneth M. Bryden, Daniel A. Ashlock, *Evolutionary Optimization Using Graph Based Evolutionary Algorithms*, proceedings of 2003 IMECE, pp. 315-320, 2003.

ACADEMICS:

Teaching Interests:

I am interested in developing active learning centered classes and activities, with a focus on thermal-fluid systems, power plant technology and engineering optimization curriculum. I would also like to pursue undergraduate research as a teaching tool.

Classes Taught:

- Sophomore Thermodynamics I (Spring 2006)
- Junior Thermodynamics II (Summer 2007)

- Elements and Performance of Power Plants (Spring 2007, Spring 2008)
- Introduction to Power Plant Design (Fall 2006, Fall 2007)
- Mechanical Engineering Independent Study (Fall 2006)
- Introduction to Systems Engineering and Analysis (Fall 2008)

PROFESSIONAL SOCIETIES:

- Member American Society of Mechanical Engineers
- Member American Institute of Aeronautics and Astronautics
- Member Institute of Electrical and Electronic Engineers
- Member IEEE Computational Intelligence Society
- Member International Council on Systems Engineering
- Member National Defense Industry Association

SERVICE:

Conferences and Journals:

- Referee for IEEE Transactions on Evolutionary Computation, 2005-present.
- Referee for Artificial Neural Networks in Engineering Conference, 2006-present
- Referee for IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology, 2006-present.
- Competition chair for binary time series prediction competition, Artificial Neural Networks in Engineering Conference, 2007.
- Referee for International Journal of General Systems, 2008-present.
- Program Committee IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology, 2008-present.
- Referee for Engineering Optimization Journal, 2008-present.
- Faculty Advisor to student chapter of International Council on Systems Engineering
- Organizing Committee, Artificial Neural Networks in Engineering Conference, 2008-present.

Awards:

- Best Paper Award, Artificial Neural Networks in Engineering Conference, 2008.
- Teaching Excellence Award from Iowa State University, 2007.

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